GM8802C-D

User Manual

GM8802C-D110101

48010224231000

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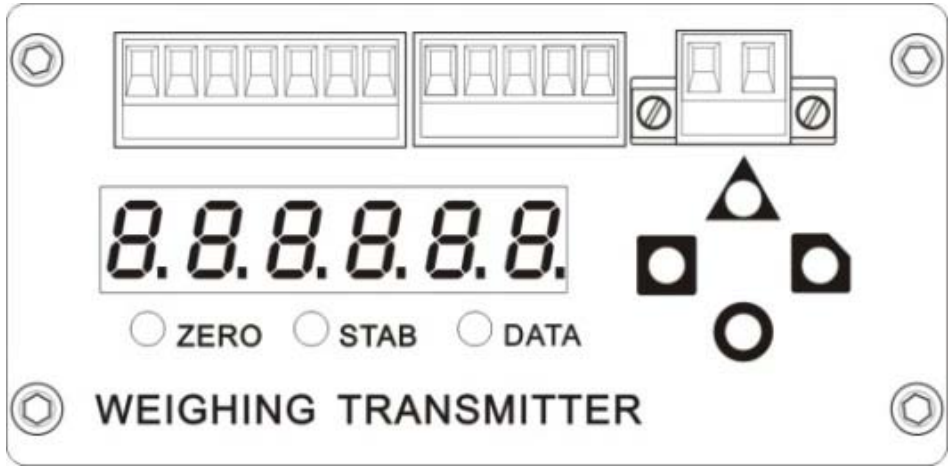
1 General Description

GM8802C-D weighing transmitter is specially designed for industrial weighing field. It has the features of steady characteristics, easy to operate. It is widely used in concrete, bitumen mixing plants, blast furnace and converter, etc..

1.1 Functions and Features

- Small dimension, handsome appearance, easy to operate.
- Applicable to all kinds of resistance strain gauge bridge load cell.
- Front panel numerical calibration
- Multilevel of digital filter
- Automatic zero –tracking
- Automatic zeroing when power up
- Bothway serial port(**RS-232/RS-485**)
- Calibration via serial interface

1.2 Front Panel



Main Display: 6 digits, for displaying weight, analog output value, and the information of parameters.

Status Indicator Lamp:

- **ZERO:** Zero position. Light up when present weight on the platform is within **0±1/4d**.
- **STAB：** Light up when changes of weight values are within stability criterion range.

- **DATA:** Light up when data transmission.

Keypad:

key to zeroing and exit from the current function status.

key to choose the parameter items.

key to choose the functions of parameter setting.

key to enter items (when setting parameters or calibration) or confirm the current function.

1.3 Technical Specifications

1.3.1 General Specifications:

Power supply ： **DC24V ± 5%**
Working temperatures ： **-10～40℃**

Humidity ： **90% R.H** without dew

Power ： about 4**W**
Dimension ： **82×92×45**（**mm**）

1.3.2 Analog Part:

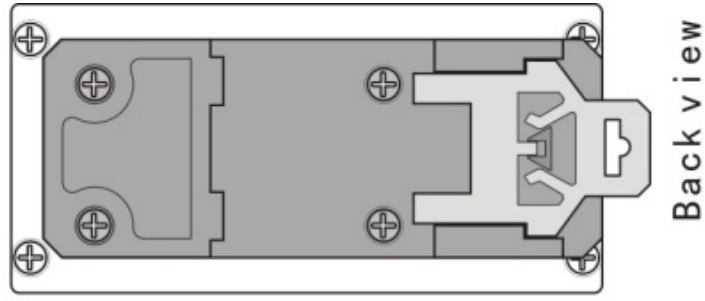
Load cell exciting voltage ： **DC5V 200mA（MAX）**
Input resistance ： **10MΩ**
Zero point adjustment range：**0.2～8mV** when the sensor is **2mV/V;**
0.02～12mV when the sensor is 3**mV/V;**
Input sensitivity ： **0.1uV/d**
Input range：**0.2～10.5mV** (when the sensor is **2mV/V)**
0.02～15mV(when the sensor is **3mV/V)**
A/D conversion： **Sigma - Delta**
A/D conversion speed：**120times**/second
Non-linear ： **0.01% F.S**
Gain drifting ： **10PPM/**℃
Precision：**1/30000**

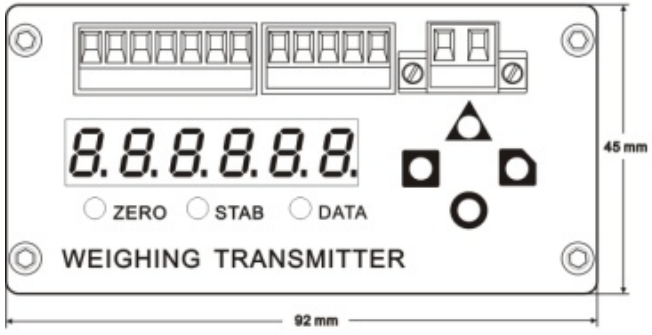
1.3.3 Digital Part:

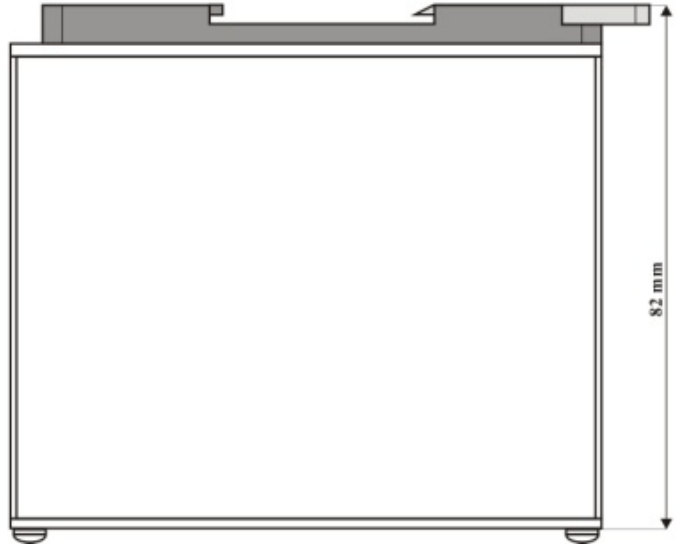
Display ： 6 high light red LEDs
Negative data display ： “-”
Overflow display：“**OFL**”
Position of decimal point ： **5** options
Keypad：**4** beep keys

1.4 Dimensions

Dimension of front panel:
Length：82mm
Width：92mm
Hight：45mm



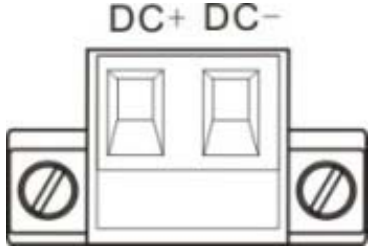




2 Installation

2.1 Connection of Power Supply

GM880C-D weighing transmitter uses **24V** direct-current power and the connection is as follows:



DC+: Positive pole

DC-: Negative pole

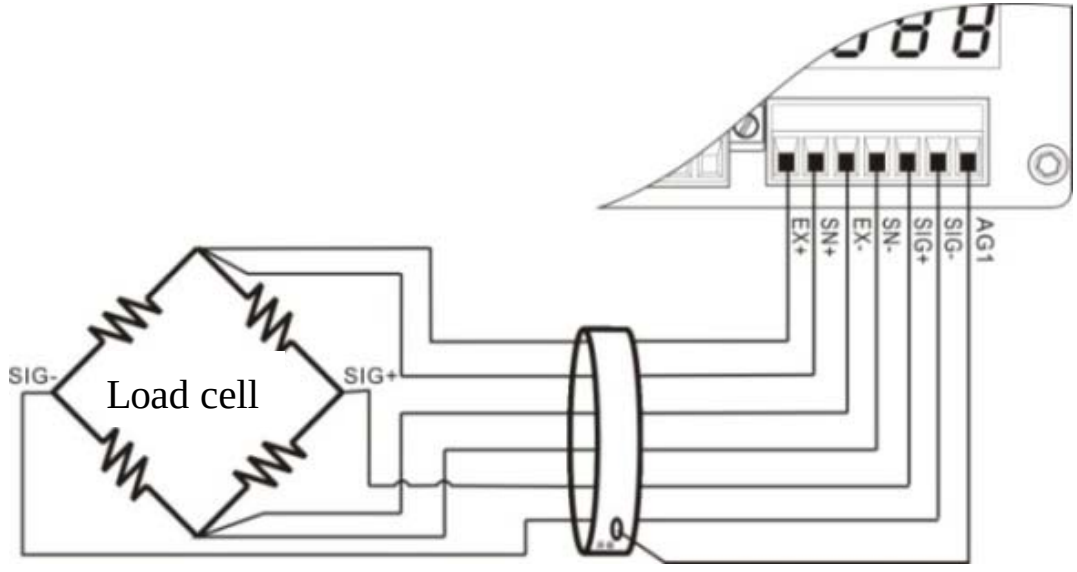
2.2 Connection of Load Cell

GM8802C-D weighing transmitter need to be connected with bridge type resistance strain gauge load cells as below figures. When you chose the four-wired load cells, you must bridge the **SN+** with **EX+** and bridge the **SN-** with **EX-**.

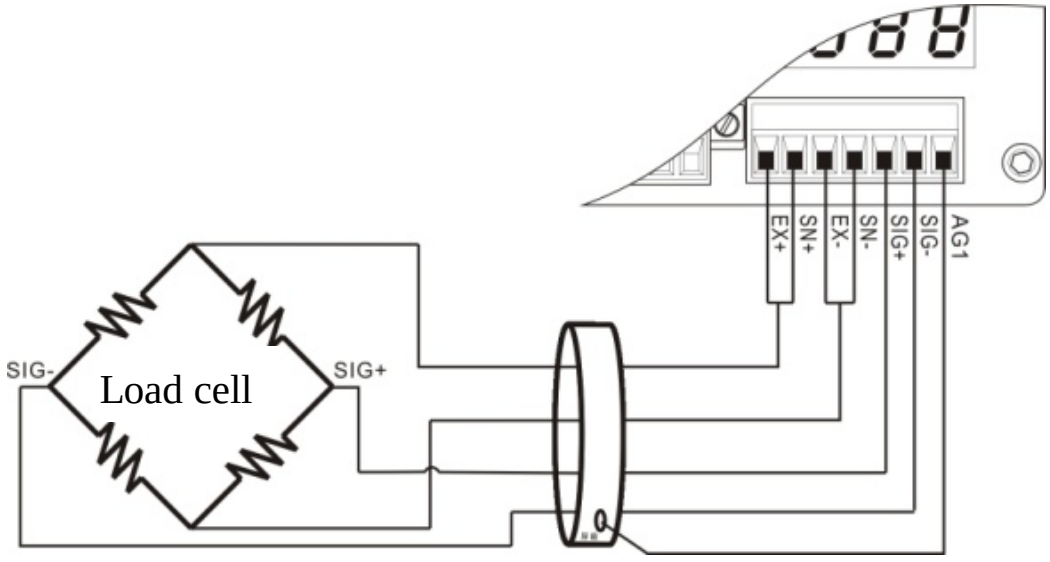
The signal definition of each port of the load cell connector as follows:

Port	EX+	SN+	EX-	SN-	SIG+	SIG-	AGI
Connection	Excitation+	Sense+	Excitation-	Sense-	Signal+	Signal-	Shield

2.2.1 6-Wired Connection

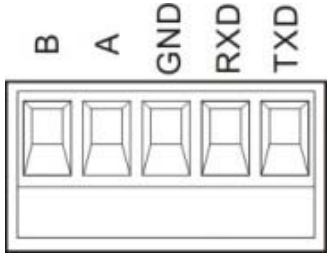


2.2.2 4-Wired Connection



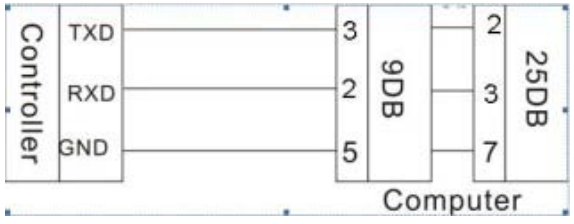
1. The signals from the load cells are low voltage analog signals, which are easily affected by electro-noise, so the cables connecting load cells to indicator should use shielded cables, and not bind with other cables, especially power supply cables.
2. For the application of short-transporting-distance and lower precision, **4**-wired connection can be used; otherwise, **6**-wired should be used.
3. For the application of multi-load cell in parallel connection, the sensitivity of each load cell (mV/V) must be same.

2.3 Connection of Serial Interface

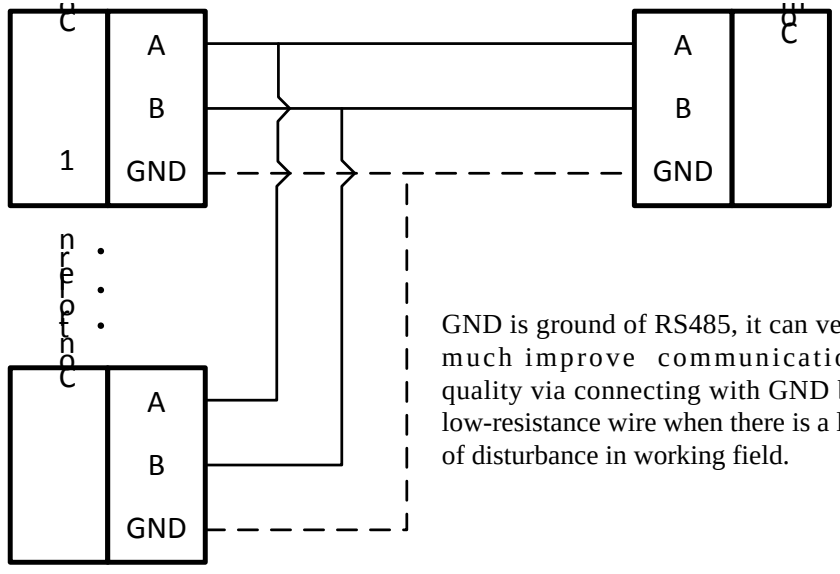


GM8802C-D supplies one serial interface that can be chosen as **RS232** or **RS485**. The definition is as follows:

RS232 Connection:



RS485 Connection:



GND is ground of RS485, it can very much improve communication quality via connecting with GND by low-resistance wire when there is a lot of disturbance in working field.

3 Calibration

3.1 Descriptions of Calibration

（1）Calibration procedure must be executed when a **GM8802C-D** weighing transmitter is put in use at the first time, the preset parameters may no longer meet the user's needs, and any part of the weighing system was changed. Position of decimal point, minimum division, maximum capacity, zero, and gain can be set and confirmed through calibration.

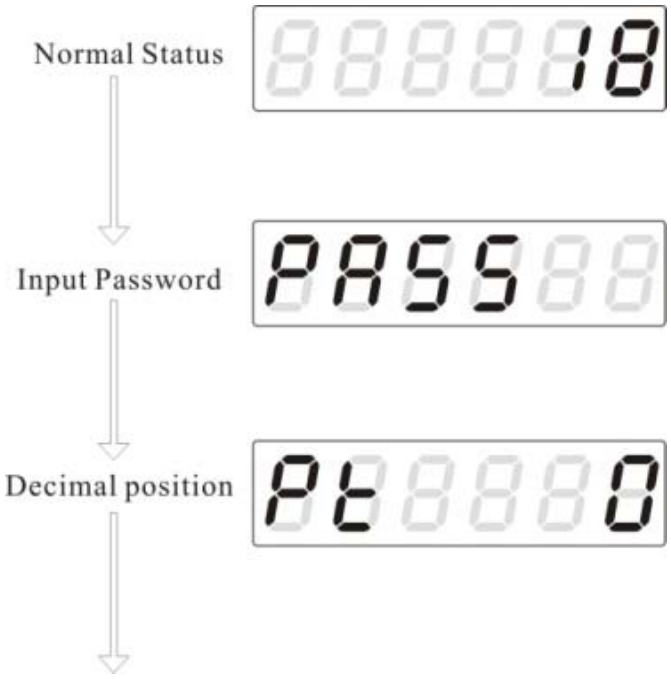
（2）If you want to skip one parameter to next one, press ● directly; If you want to set only one parameter, please press ● to save your desired value and then press ■ to return normal working status.

（3）Please refer to page **21"3.7** Log Table for Parameter Calibration **1**" for details.

（4）During calibration, please make record in page **23 "3.8** Log Table for Parameter Calibration **2"** for later urgent situation.

（5）During calibration, please refer to page**108**“**8**. Error and Alarm Messages” for details.

3.2 Flow Chart of Setting Parameters



1.Under normal status, press ■ twice, then display **CAL**, press ● to enter password inputting interface.

2.When displaying **PASS**, press ●, then input the correct password, **CAL ON** displayed for one second , then automatically enter Decimal position

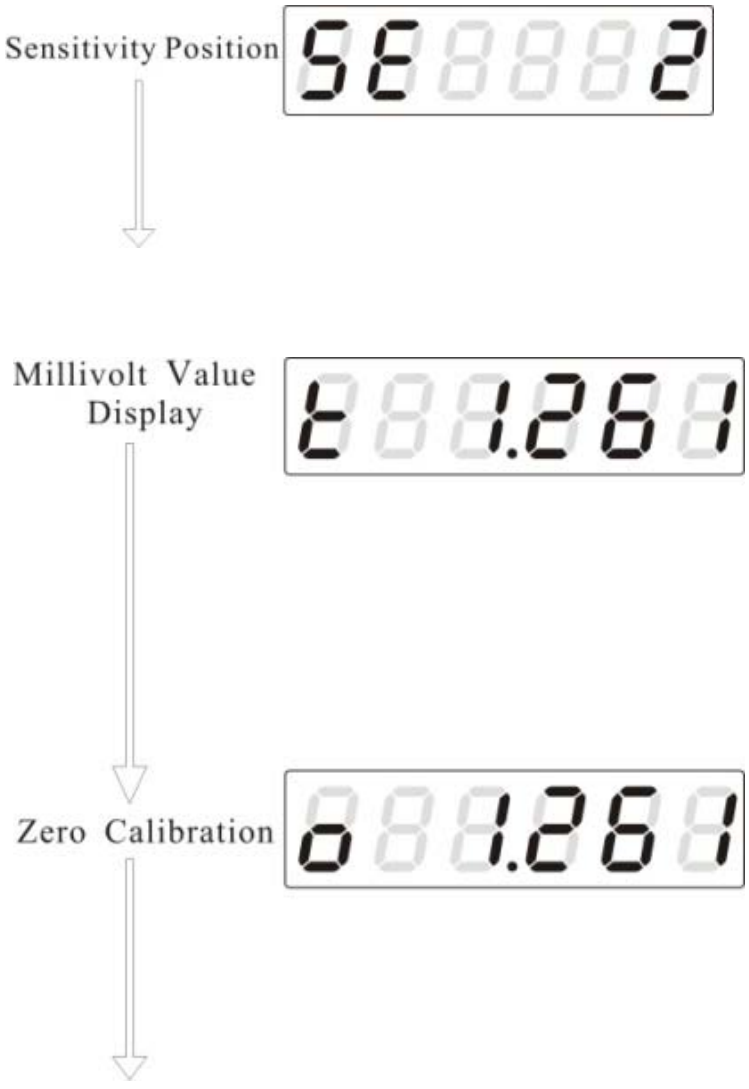
3.Press ▲ to select a desired decimal position(**0**、**0.0**、**0.00**、**0.000** or **0.0000**), then press ● to save and enter next step. But if no need to change, press ● directly to enter next Min. division setting interface.

Min. Division

4.Press ▲ to select a desired Min. division (**1**、**2**、**5**、**10**、**20** or **50**), then press ● to save and enter next Max. capacity setting. But if no need to change, press ●directly to enter next step.

Max.Capacity

5. Input Max. Capacity(≤Min.Division×**30000**), then press ● to save and enter next step. But if no need to change, press ●directly to enter next step.

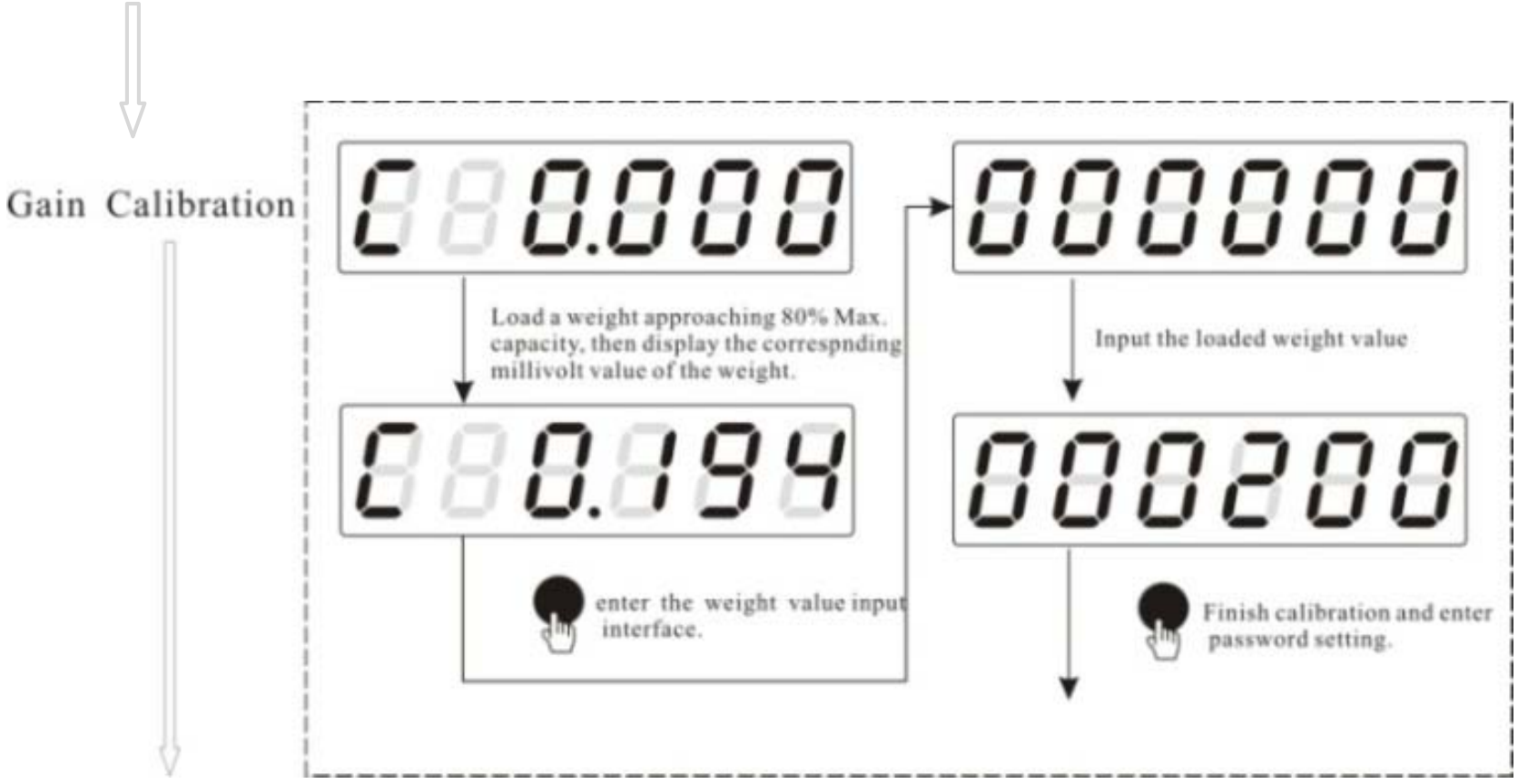


6. Press ▲to select a desired sensitivity**(2 or3)**, then press ● to save and enter next step. But if no need to change, press ●directly to enter next Millivolt value display interface.

7.During normal calibration, press ● to enter zero calibration. The displaying value is close to the value got from the **SIG+/SIG-** of sensor by a multimeter, pls refer to definite descriptions in **17 "3.3** Millivolt value display".

8.Clear the platform, press ●to finish zero calibration when **STAB** indicator lamp lights up and enter gain calibration.If no need to zero calibrate, press ■ to enter gain calibration.

Follow the below flow chart, then you can finish gain calibration and enter password setting. If no need to gain calibrate, just press ■ to enter next password setting interface.


Gain Calibration
C 0.000
Load a weight approaching 80% Max. capacity, then display the correspnding millivolt value of the weight.
C 0.194
enter the weight value input interface.
000000
Input the loaded weight value
000200
Finish calibration and enter password setting.

9.Press ● to enter serial ports calibration switch setting, press ▲ to choose a desired position, then press ● again to enter next step. If no need to set the position of the switch ,just press ■ to enter next password setting interface.

10.Finish password setting as page**103 "6.3** Setting Password", then return to normal status. If no need to set password, just press ■ to return to normal status..

11. Weight value display interface.

3.3 Millivolt Value Display

This function is mainly used for system test, position-error test for weighing mechanism and linearity test for load cell.

1. System Test

(1) If display data changes with loaded weight changes, it shows that connection of load cell is correct and weighing mechanism works well.

(2)If display value is **OFL** (or –**OFL**), it means that loaded weight on load cells is too large (or too small). Please unload the weight (or load more), if display value is still **OFL** (or –**OFL**), the possible reasons are as follows:

a. There is something wrong with weighing mechanism, please check and clear.

b. The connection of load cell is incorrect, please check and clear.

c. Load cells may be damaged, please replace.

2. Position-error Test for Weighing Mechanism

Load a same weight on each corner of weighing mechanism and record displayed millivolt value respectively. If differences among these values are obvious, please adjust weighing mechanism.

3. Linearity Test for Load Cell

Load same weight for several times, and record displayed value every time. If one or two values are obviously much larger or smaller than any others, it means that the linearity of load cell is bad.

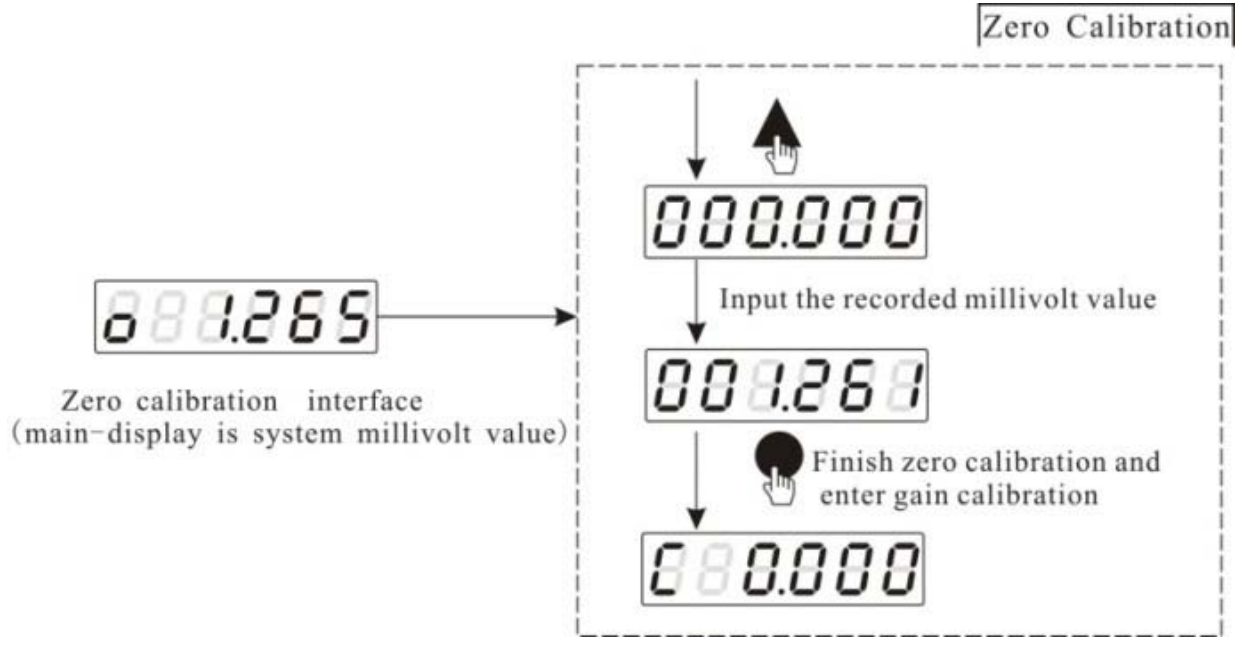
3.4 Calibration with Weight

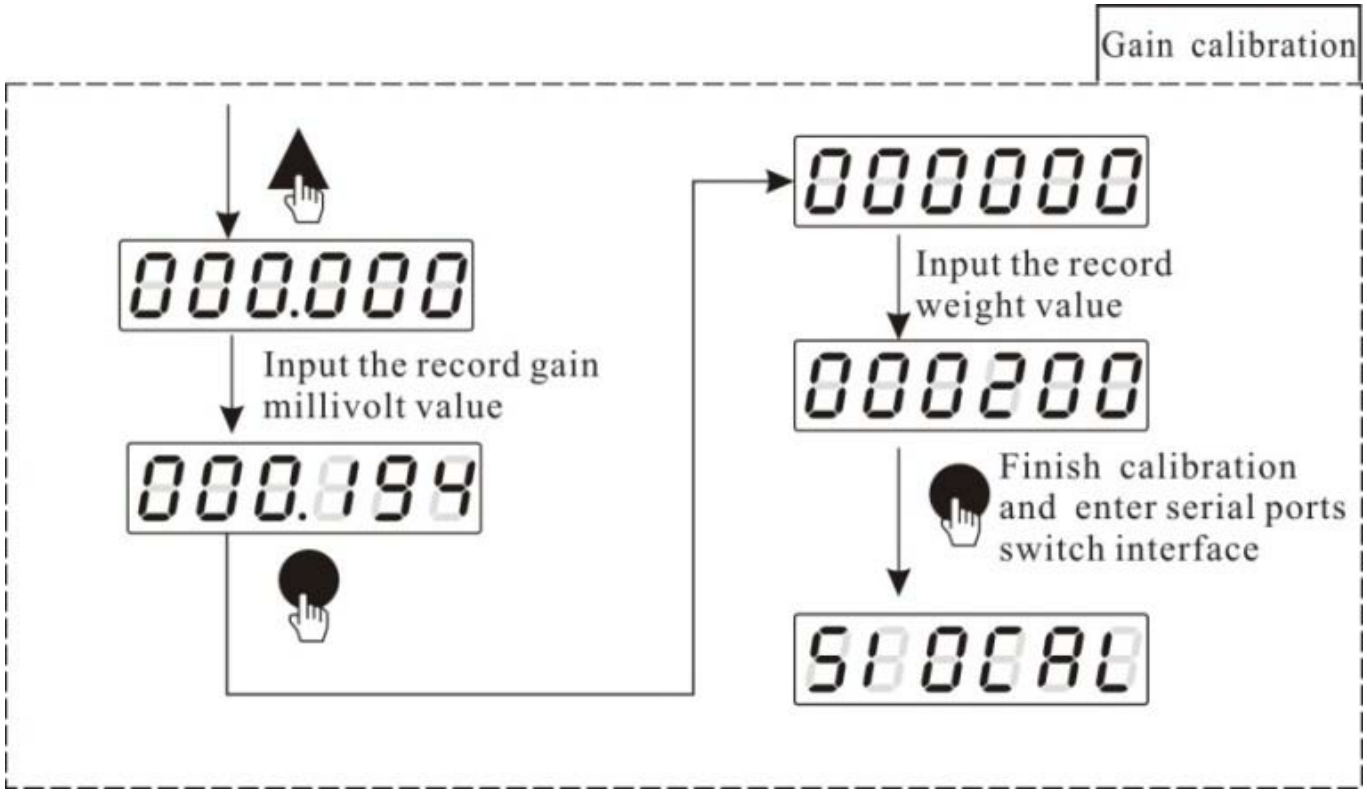
During calibration with weight, please record the zero millivolt value, gain millivolt value and the loaded weight value in the blank table below. If it is not convenient to load a weight to calibrate, these values can be used for calibration without weight.

	Zero millivolt value(mV)	Gain millivolt value(**mV**）	Weight value	Date	Remarks
1					
2					
3					
4					
5					

3.5 Calibration without Weight

When it is not convenient to load a weight to calibrate, calibration can be done without weight using recorded data in the table in section **3.8**. However, this method is just used for some emergencies, it will make calibration result incorrect if load cells, or indicator has been replaced.




Gain calibration
000.000
Input the record gain millivolt value
000.194
000000
Input the record weight value
000200
Finish calibration and enter serial ports switch interface
SIOCAL

3.6 Serial Ports Calibration Switch

When calibration via serial ports(**rS、SP1 or Modbus)** is needed, the serial ports calibration switch must be **"ON"**, or the command of serial ports calibration will return to errors.

3.7 Log Table for Parameter Calibration 1

Symbol	Parameter	Value of parameter	Default
Pt	Decimal Point	**0 0.0 0.00 0.000 0.0000**	**0**
1d=	Min. Division	**1 2 5 10 20 50**	**1**
CP	Max. Capacity	≤Min. Division***30000**	**10000**
SE	Sensitivity of sensor	**2 3**	**2**
t	System millivolt		
o	Zero position		

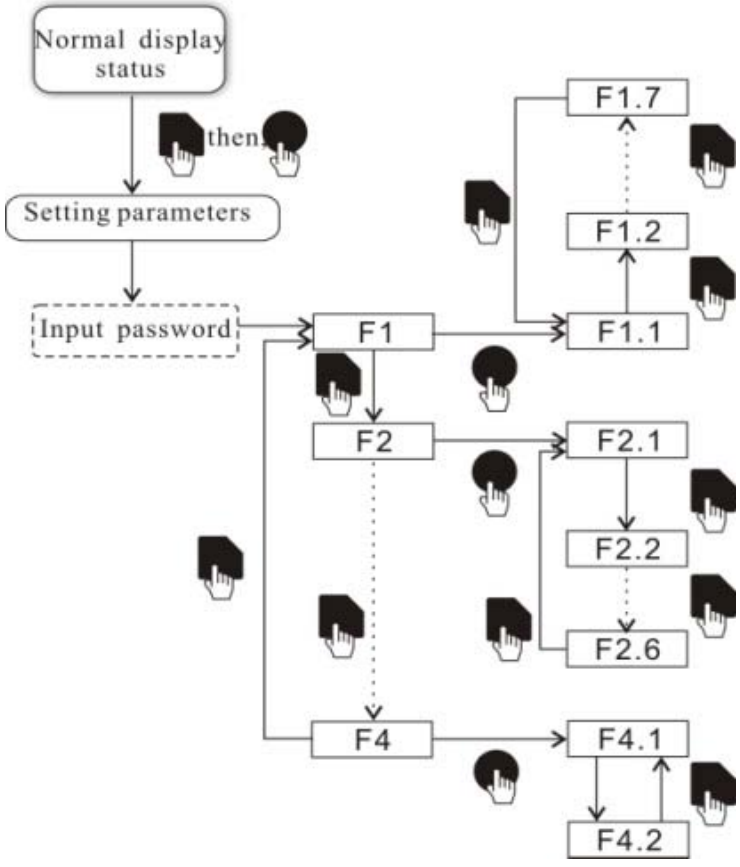
C	Gain		
SIOCAL	Serial ports calibration switch		
PASS	Password Setting		**000000**

3.8 Log Table for Parameter Calibration 2

Parameter	Calibrated Value	Data	Remarks
Decimal Point			
Min. Division			
Max. Capacity			
Sensor sensitivity			
Password Setting			

4 Setting Parameter

4.1 Flow Chart of Setting Parameters



1. Press ■ to select a desired item among sibling items;
2. Press ● to enter minor terms, Press ■ to return to last item;
3. Pls refer to below list for descriptions of parameters.

Descriptions of Working Parameters

NO.	Parameter	Default	Descriptions	Setting Method
F1			**Item 1**	
F1.1	**00~99**	**01**	Scale **ID**	**4.2.1**
F1.2	**OFF/ON**	**OFF**	Automatic zeroing switch when power up. Automatically zeroing if it is set **"ON"**. **"Error2"** Alarms if current value>Max. Capacity*Zeroing range; **"Error3"** Alarms if the scale is not stable.	**4.2.2**
F1.3	**0-9**	**0**	Zero-tracking range(**0~9d** optional): used to	**4.2.1**

			automatically check the zero slight drifting caused by the residual material on the platform. Disabled if this parameter is set "**0**".	
F1.4	**1-9**	**1**	Stability criterion range(**1~9d** optional):: If the change of weight value is within stability criterion rang, then it is a stable status.	**4.2.1**
F1.5	**0-99**	**50**	Zeroing range: **0%-99%** of Max. Capacity. If the current weight > Max. Capacity* Zeroing range, then**"Error2"** alarms.	**4.2.1**
F1.6	**0-9**	**5**	Digital filter：**0**：no filter；	**4.2.1**

			9：the strongest filter	
F1.7	**0-9**	**0**	Steady filter (the second filter based on the first filter)： **0**：no filter； **9**：the strongest filter	**4.2.1**
F2			**Item 2**	
F2.1	**1200~ 57600**	**9600**	Serial port Baud rate	**4.2.2**
F2.2	**rS/rE/bUS/ EASy/SP1/t t/rdP**	**bUS**	Serial port protocol	**4.2.2**
F2.3	**rEAd/**	**rEAd**	**rEAd**(command mode) or	**4.2.2**

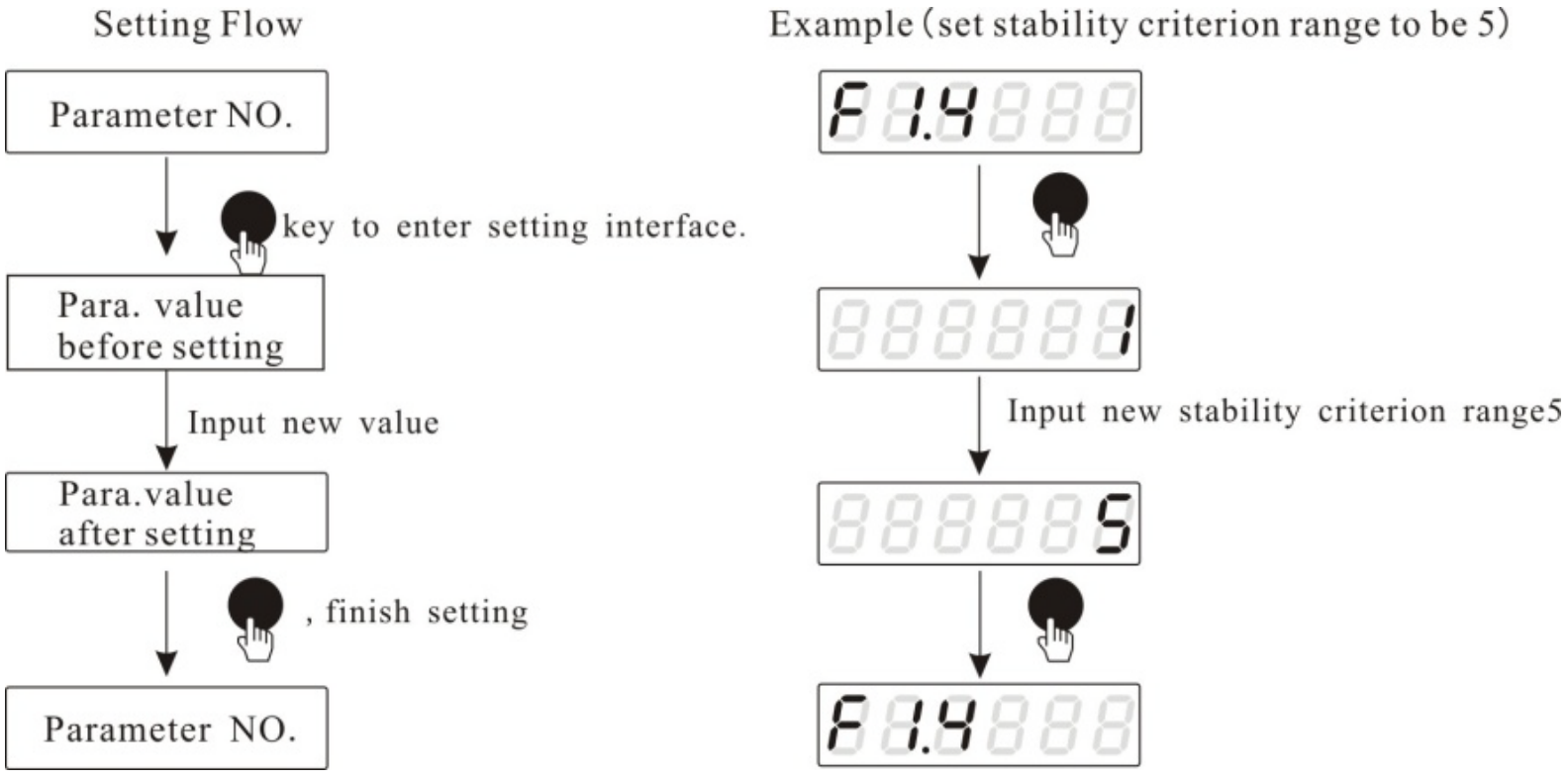
	Cont		**Cont** continuous mode） **rE(rS/SP1or EASy)** serial port communication mode. **Ineffective when F2.2 is set as bUS /tt/rdP.**	
F2.4	**rtU/ASC**	**rtU**	**rtU** or **ASCII**; **Modbus protocol special communication mode. Ineffective when F2.2 is set as rE/rS/SP1/EASy/tt/rdP**.	**4.2.2**
F2.5	**7-E-1/** **7-O-1/** **7-n-2/** **8-E-1/**	**8-E-1**	Data frames format: **7-E-1：7data bits, Even Parity, 1stop bit;** **7-O-1：7 data bits, Odd Parity, 1stop bit;** **7-n-2：7data bits, No Parity, 2 stop bits;**	**4.2.2**

	8-O-1/ **8-n-1/** **8-n-2**		**8-E-1：8data bits, Even Parity,1stop bit;** **8-O-1：8data bits, Odd Parity,1stop bit;** **8-n-1：8data bits, No Parity,1stop bit;** **8-n-2：8 data bits, No Parity,2stop bits;**	
F2.6	**nonE/** **10/20/** **30/40/50**	**nonE**	Option of serial port speed, adjust the interval between two data frames when continuous sending datas. **nonE**：The interval between two data frames is the time of next byte during current baud rate. **10~50**：The interval between two data frames is **10~50ms**.	**4.2.2**

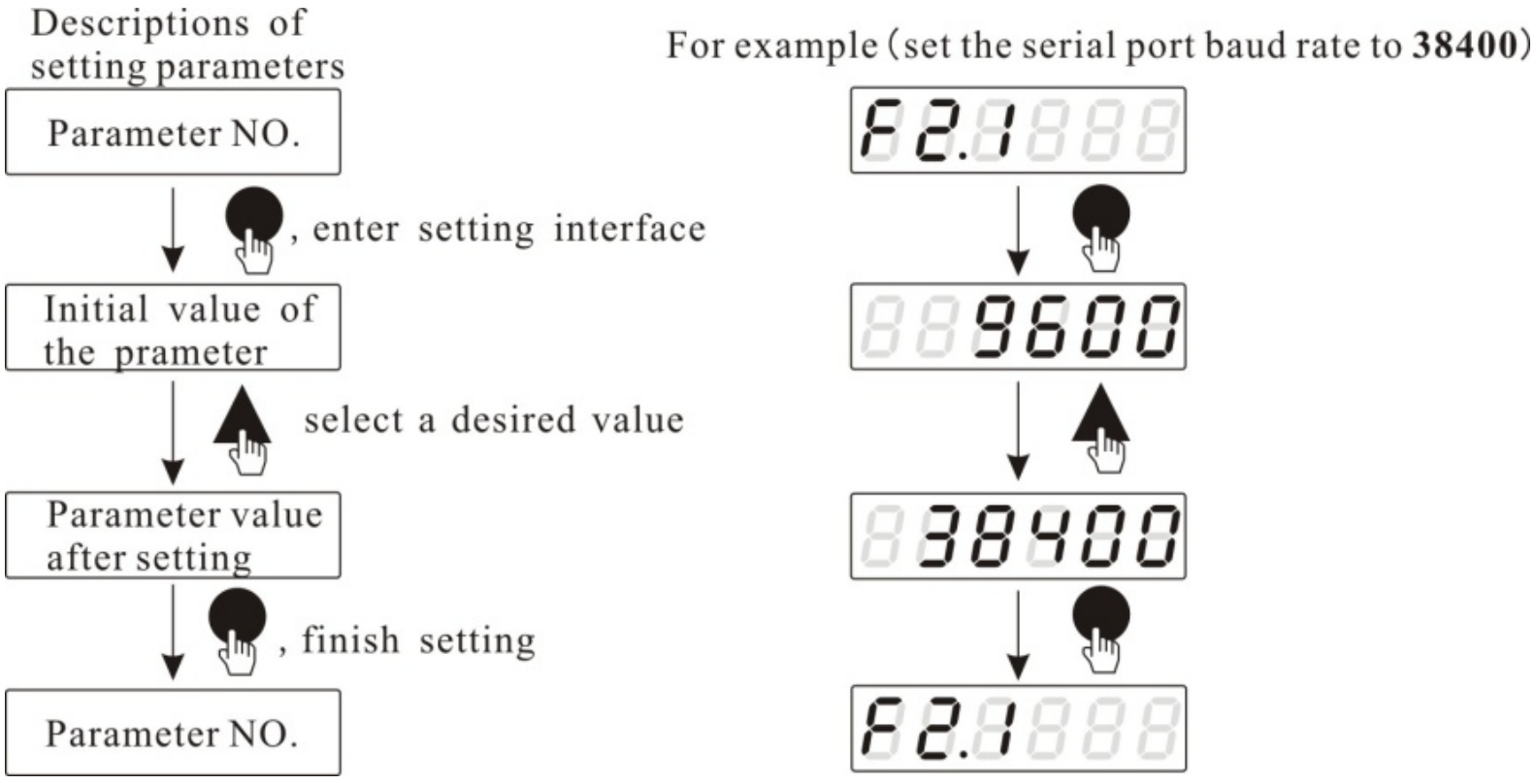
F3			**Item 3**	
F3.1～ F3.9	**000000～ 999999**	**000000**	**9** registers available for users，use system decimal point to display. Read-write through keys or serial ports（**ModBus/RS/SP1**）.	**4.2.1**
F4			**Item 4**	
F4.1	**OFF/ON**	**OFF**	Switch for parameter password setting	**4.2.2**
F4.2		**000000**	Setting parameter password：Effective when **F4.1=ON**	**6.3**

4.2 Method of Setting Parameters

4.2.1 Data Input Method



4.2.2Option Selecting Method



5 Serial Communication

GM8802C-D has **RS232** serial interface to communicate with upper computer. There are seven communication protocols: **： rS** protocol /**rE** protocol /**Modbus** protocol (**bus**)/ fast protocol (**EASy**)/**SP1** protocol /**tt TOLEDO**/**rdP PHILIPS** protocol.

5.1 EASY Protocol

Communication mode can be set as continuous mode(**Cont**) and command mode（**Read**）.

Data Frames：	**8**data bits, **1** stop bit, Even parity (**8- E-1**)
	8data bits, **1** stop bit, Odd Parity (**8- O-1**)
	8data bits, **1** stop bit, No Parity (**8- n-1**)
	8data bits, **2** stop bits, No Parity (**8- n-2**)

Baud Rate：**1200**, **2400**, **4800**, **9600**, **19200**, **38400, 56700(Optional)**

Code：binary system

5.1.1 Continuous Mode(Cont)

Under this mode, the indicator will automatically transmit collected data to upper computer without command. A complete data frame consists of five bytes: one mark byte; one status byte and three data bytes(compressed **BCD** code, high-order ahead).

Data	Mark byte	Status byte	**BCD1**	**BCD2**	**BCD3**
Description	**FFH**	Status byte	Main display: the first and second bit	Main display: the third and fourth bit	Main display: the fifth and sixth bit

The definition of "Status byte":

Status byte(binary system)									
D7	**D6**	**D5**	**D4**	**D3**	**D2D1D0**				
no	zero	overflow	stable	Plus/ minus	current decimal position				
Fixed:**0**	**0:**not zero **1**：zero	**0**： normal **1**： overflow	**0**： stable **1**： unstable	**0**： plus **1**： minus	**100**	**011**	**010**	**001**	**000**
					4bits	**3**bits	**2**bits	**1**bit	**0**bit

For example:

When the transmitter sends out a hexadecimal data as below:

Data frames: **FF 03 00 12 34**

Refer to above data frame form, we know the data of main display is **1234**, the status byte is **03**(refer to "The definition of "Status byte"**,** the corresponding hexadecimal data is **00000011**), then we know current status is: not zero, normal , stable, plus, current decimal point is the third bit.

5.1.2 Command Mode(Read)

Under this mode, the indicator will transmit collected data to upper computer only when received command.

Data	**R**	**CR**	**CF**
Description	**52H**	**0DH**	**0AH**

Response from the indicator:

The data frame is just the same as that when Continuous Mode .

5.2 RE Protocol

Communication mode can be set as continuous mode(**Cont**) and command mode（**Read**）.

Data Frames：	**8**data bits, **1** stop bit, Even parity (**8- E-1**)
	8data bits, **1** stop bit, Odd Parity (**8- O-1**)
	8data bits, **1** stop bit, No Parity (**8- n-1**)
	8data bits, **2** stop bits, No Parity (**8- n-2**)
	7data bits, **1** stop bit, Even parity (**7- E-1**)
	7data bits, **1** stop bit, Odd parity (**7- O-1**)
	7data bits, **2** stop bits, No parity (**7- n-2**)

Baud Rate：**1200**, **2400**, **4800**, **9600**, **19200**, **38400, 56700(Optional)**

Code：**ASCII**

5.2.1 Continuous Mode(Cont)

Under this mode, the indicator will automatically transmit collected data to upper computer without command. The data frames as follows:

Status	,	**GS**	,	**+/-**	Display value	Unit	**CR**	**LF**

Here:

Status ——2bits; 4FH 4CH;OL(overflow);53H 54H; ST(stable);55H 53H; US(unstable)

, **——**Separator

GS ——2bits; 47H 53H

+/- ——1bit; 2BH(+) ; 2DH(-)

Display value ——**7 bits**(include decimal point); high-order is a blank space when no decimal point

Unit ——**2bits; kg; 4BH 67H**

CR ——0DH

LF ——0AH

For example:

When the transmitter sends out a date sequence as below:

53 54 2C 47 53 2C 2B 30 31 31 2E 31 32 30 4B 67 0D 0A

Then we know the current status of indicator is:

Stable; data is positive number; current weight value is**11.120kg**

5.2.2 Command Mode(Read)

Under this mode, the indicator will transmit collected data to upper computer only when received command.

Data	R	E	A	D	CR	LF
Description	52H	45H	41H	44H	0DH	0AH

Response from the indicator:

The data frame is just the same as that of **RE** protocol's Continuous Mode .

5.3 RS Protocol

Communication mode can be set as continuous mode(**Cont**) and command mode（**Read**）.

Data Frames：	**8**data bits, **1** stop bit, Even parity (**8- E-1**)
	8data bits, **1** stop bit, Odd Parity (**8- O-1**)
	8data bits, **1** stop bit, No Parity (**8- n-1**)
	8data bits, **2** stop bits, No Parity (**8- n-2**)
	7data bits, **1** stop bit, Even parity (**7- E-1**)
	7data bits, **1** stop bit, Odd parity (**7- O-1**)
	7data bits, **2** stop bits, No parity (**7- n-2**)

Baud Rate：**1200**, **2400**, **4800**, **9600**, **19200**, **38400, 56700(Optional)**

Code：**ASCII**

CRC Check and Calculate Method: Count the sum of all the left bytes and convert the sum to be decimal date, and then convert the **2** low-order digits of the decimal date to **ASCII** code. For example, **02 4D 2B 30 31 30 2E 37 36 30,** the sum is **1D6,** convert it to decimal **470**, then convert the last two numbers **7**、**0** to **ASCII 37 30**.

5.3.1 Continuous Mode(Cont)

Under this mode, the indicator will automatically transmit collected data to upper computer without command. The data frames as follows:

STX	Status	**+/-**	Display value	**CRC**	**CR**	**LF**

Here:

STX——1 bit; start : **02H**

Status ——1bit; 4DH:M(stable)**; 53H:S**(unstable)**; 4FH:O**(overflow)

+/- ——1bit; 2BH(+) ; 2DH(-)

Display value ——**7 bits**(include decimal point); high-order is a blank space when no decimal

point

CRC ——2 bits, check sum

CR ——0DH

LF ——0AH

For example:

When the transmitter automatically returns to the below data:

02 4D 2B 30 31 30 2E 37 36 30 37 30 0D 0A

Then we know current status is: stable, plus, and current weight value is **10.760.**

5.3.2 Command Mode(Read)

Under this mode, the indicator will transmit collected data to upper computer only when received command.

5.3.2.1 Reading the Current Status of GM8802C-D

Sending Command format:

STX	Scale ID	R	S	CRC	CR	LF

Received data sequence is correct:

STX	Scale ID	R	S	000	Status	Display value	CRC	CR	LF

Received data sequence is incorrect:

STX	Scale ID	R	S	N	O	CRC	CR	LF

Here:

Scale ID —— 2bits，range: **00~99**

R—— 1bit，**52H**

S —— 1bit，**53H**

000 —— 3bits, 30H 30H 30H

Status —— 1bit, 4DH:**M**(stable)；**53H**:**S**(unstable)；**4FH**:**O**(overflow)

Display value—— 6bits, not include decimal point, high-order is minus when the display value is minus.

N—— 1bit, 4EH

O—— 1bit, 4FH

For example:

Command from upper computer：**02 30 31 52 53 36 34 0D 0A**

Correct response format：**02 30 31 52 53 30 30 30 4D 2D 30 32 32 35 35 38 34 0D 0A**（**1#** Scale,

stable status, current main display is **-2.255**）

Incorrect response format：**02 30 31 52 53 4E 4F 32 31 0D 0A**

5.3.2.2 Reading Decimal Point

Sending Command format:

STX	Scale ID	R	P	CRC	CR	LF

Received data sequence is correct:

STX	Scale ID	R	P	DDDDDD	CRC	CR	LF

Received data sequence is incorrect:

STX	Scale ID	R	P	N	O	CRC	CR	LF

Here:

P —— 1bit，50H

DDDDDD—— 6bits, **000000~000004** corresponding **0~4** decimal point positions.

For example:

Command from upper computer：**02 30 31 52 50 36 31 0D 0A**

Correct response format：**02 30 31 52 50 30 30 30 30 30 33 35 32 0D 0A** (decimal point position is **3**, that is **0.000)**

Incorrect response format：**02 30 31 52 50 4E 4F 31 38 0D 0A**

5.3.2.3 Reading the Sensitivity of Sensor

Sending Command format:

STX	Scale ID	R	E	CRC	CR	LF

Received data sequence is correct:

STX	Scale ID	R	E	DDDDDD	CRC	CR	LF

Received data sequence is incorrect:

STX	Scale ID	R	E	N	O	CRC	CR	LF

Here:

E—— 1bit，45H

DDDDDD—— 6bits, 000000~000001 corresponding **2mV/V、3mV/V**.

For example:

Command from upper computer：**02 30 31 52 45 35 30 0D 0A**

Correct response format：**02 30 31 52 45 30 30 30 30 30 30 33 38 0D 0A** (the sensitivity of sensor is **2mV/V)**

Incorrect response format：**02 30 31 52 45 4E 4F 30 37 0D 0A**

5.3.2.4 Reading Max. Capacity and Division Value

Sending Command format:

STX	Scale ID	R	M	CRC	CR	LF

Received data sequence is correct:

STX	Scale ID	R	M	Division value	Max. Capacity	CRC	CR	LF

Received data sequence is incorrect:

STX	Scale ID	R	M	N	O	CRC	CR	LF

Here:

M —— 1bit，4DH

Division value —— 2bits, **1**、**2**、**5**、**10**、**20**、**50** optional

Max. Capacity—— 6bits, maximum capacity value

For example:

Command from upper computer：**02 30 31 52 4D 35 38 0D 0A**

Correct response format：**02 30 31 52 4D 30 35 30 35 30 30 30 30 35 32 0D 0A** (Min. division value is **5**, Max. Capacity is **50000**)

Incorrect response format：**02 30 31 52 4D 4E 4F 31 35 0D 0A**

5.3.2.5 Reading the Working Parameters

Sending Command format:

STX	Scale ID	R	F	Working parameter	0	CRC	CR	LF

Received data sequence is correct:

STX	Scale ID	R	F	Working parameter	0	DDDDDD	CRC	CR	LF

Received data sequence is incorrect:

STX	Scale ID	R	F	N	O	CRC	CR	LF

Here:

F —— 1bit，46H

Working parameter —— 2 bits, confirm the working parameter according to current data

DDDDDD—— 6bits, current working parameter value

For example:

Command from upper computer：**02 30 31 52 46 31 34 30 30 30 0D 0A**

Correct response format：**02 30 31 52 46 31 34 30 30 30 30 30 30 35 39 33 0D 0A （Working parameter 1.4:** range of motion detecting is **5**）

Incorrect response format：**02 30 31 52 46 4E 4F 30 38 0D 0A**

5.3.2.6 Serial Zeroing Function

Sending Command format:

STX	Scale ID	C	C	CRC	CR	LF

Received data sequence is correct:

STX	Scale ID	C	C	O	K	CRC	CR	LF

Received data sequence is incorrect:

STX	Scale ID	C	C	N	O	CRC	CR	LF

Here:

C —— 1bit, 43H

K —— 1bit, 4BH

For example:

Command from upper computer：**02 30 31 43 43 33 33 0D 0A**

Correct response format：**02 30 31 43 43 4F 4B 38 37 0D 0A**

Incorrect response format：**02 30 31 43 43 4E 4F 39 30 0D 0A**

5.3.2.7 Calibration

1 . Calibration the Decimal Point Position

Sending Command format:

STX	Scale ID	C	P	Decimal point position	CRC	CR	LF

Received data sequence is correct:

STX	Scale ID	C	P	O	K	CRC	CR	LF

Received data sequence is incorrect:

STX	Scale ID	C	P	N	O	CRC	CR	LF

Here:

P —— 1bit, 50H

Decimal point position —— 1bit, range **0~4**

For example:

Command from upper computer：**02 30 31 43 43 33 33 0D 0A**

Correct response format：**02 30 31 43 43 4F 4B 38 37 0D 0A**

Incorrect response format：**02 30 31 43 43 4E 4F 39 30 0D 0A**

2 . Calibration the Division value and Max. Capacity

Sending Command format:

STX	Scale ID	C	M	Division value	Max. Capacity	CRC	CR	LF

Received data sequence is correct:

STX	Scale ID	C	M	O	K	CRC	CR	LF

Received data sequence is incorrect:

STX	Scale ID	C	M	N	O	CRC	CR	LF

Here:

M —— 1bit, 4DH

Division value —— 2bits, writing Min. division value （**1**、**2**、**5**、**10**、**20**、**50**）

Max. Capacity —— 6bits, writing Max. Capacity

For example:

Command from upper computer：**02 30 31 43 4D 30 35 30 31 34 30 30 30 33 37 0D 0A**

（Writing data：division value is **5**，Max. capacity is **14000**）

Correct response format：**02 30 31 43 4D 4F 4B 39 37 0D 0A**

Incorrect response format：**02 30 31 43 4D 4E 4F 30 30 0D 0A**

3 . Calibration the Sensitivity of Sensor

Sending Command format:

STX	Scale ID	C	E	Sensitivity of Sensor	CRC	CR	LF

Received data sequence is correct:

STX	Scale ID	C	E	O	K	CRC	CR	LF

Received data sequence is incorrect:

STX	Scale ID	C	E	N	O	CRC	CR	LF

Here:

E —— 1bit, 45H

Sensitivity of Sensor —— 1bit, range **0~1**

For example:

Command from upper computer：**02 30 31 43 45 30 38 33 0D 0A**（Writing data：sensitivity of sensor is **0**, that is **2mV/V**）

Correct response format：**02 30 31 43 45 4F 4B 38 39 0D 0A**

Incorrect response format：**02 30 31 43 45 4E 4F 39 32 0D 0A**

4 . Zero Calibration

1) Zero Calibration with Standard Weight

Sending Command format:

STX	Scale ID	C	Z	CRC	CR	LF

Received data sequence is correct:

STX	Scale ID	C	Z	O	K	CRC	CR	LF

Received data sequence is incorrect:

STX	Scale ID	C	Z	N	O	CRC	CR	LF

Here:

Z —— 1bit, 5AH
For example:
Command from upper computer：**02 30 31 43 5A 35 36 0D 0A**
Correct response format：**02 30 31 43 5A 4F 4B 31 30 0D 0A**
Incorrect response format：**02 30 31 43 5A 4E 4F 31 33 0D 0A**

2) Zero Calibration without Standard Weight

Sending Command format:

STX	Scale ID	C	Y	Zero millivolt value	CRC	CR	LF

Received data sequence is correct:

STX	Scale ID	C	Y	O	K	CRC	CR	LF

Received data sequence is incorrect:

STX	Scale ID	C	Y	N	O	CRC	CR	LF

Here:

Y —— 1bit, 59H
Zero millivolt value —— 6bits;
For example:

Command from upper computer：**02 30 31 43 59 30 30 31 32 36 31 35 33 0D 0A**（Writing data: zero millivolt value is **1.261**）
Correct response format：**02 30 31 43 59 4F 4B 30 39 0D 0A**
Incorrect response format：**02 30 31 43 59 4E 4F 31 32 0D 0A**

5. Gain Calibration

1) Zero Calibration with Standard Weight

Add a standard weight approaching 80% of the Max. capacity ,then write in the current value of the standard weight to finish gain calibration.

Sending Command format:

STX	Scale ID	C	G	Weight value	CRC	CR	LF

Received data sequence is correct:

STX	Scale ID	C	G	O	K	CRC	CR	LF

Received data sequence is incorrect:

STX	Scale ID	C	G	N	O	CRC	CR	LF

Here:

G —— 1bit, 47H

Weight value —— 6bits; write in the standard weight value

For example:

Command from upper computer：**02 30 31 43 47 30 30 30 32 30 30 32 37 0D 0A**（writing data: the weight value is **200**）

Correct response format：**02 30 31 43 47 4F 4B 39 31 0D 0A**

Incorrect response format：**02 30 31 43 47 4E 4F 39 34 0D 0A**

2) Zero Calibration without Standard Weight

Input the standard weight value in Appendix and the corresponding gain Millivolt value to finish gain calibration.

Sending Command format:

STX	Scale ID	C	L	Millivolt value	Weight value	CRC	CR	LF

Received data sequence is correct:

STX	Scale ID	C	L	O	K	CRC	CR	LF

Received data sequence is incorrect:

STX	Scale ID	C	L	N	O	CRC	CR	LF

Here:

L —— 1bit, 4CH

Millivolt value —— 6bits; corresponding gain millivolt value of current weight value

Weight value —— 6bits; standard weight value

For example:

Command from upper computer：**02 30 31 43 4C 30 30 30 31 39 34 30 30 30 32 30 30 33 34 0D 0A**（writing data: the weight value is **200**, corresponding gain millivolt value is **0.194**）

Correct response format：**02 30 31 43 4C 4F 4B 39 36 0D 0A**

Incorrect response format：**02 30 31 43 4C 4E 4F 39 39 0D 0A**

5.3.2.8 Writing Working Parameter

Sending Command format:

STX	Scale ID	W	F	Working parameter item	0	Parameter value	CRC	CR	LF

Received data sequence is correct:

STX	Scale ID	W	F	O	K	CRC	CR	LF

Received data sequence is incorrect:

STX	Scale ID	W	F	N	O	CRC	CR	LF

Here:

W —— 1bit, 57H

F —— 1bit, 46H

Working parameter value —— 2bits; confirm the working parameter item according to current data

Parameter value —— 6bits; write-in the parameter value

For example:

Command from upper computer：**02 30 31 57 46 31 34 30 30 30 30 30 30 35 39 38 0D 0A**（write-in range of motion detecting **F1.4** is **5**）

Correct response format：**02 30 31 57 46 4F 4B 31 30 0D 0A**

Incorrect response format：**02 30 31 57 46 4E 4F 31 33 0D 0A**

5.3.2.9 Reading Register 1-9

Sending Command format:

STX	Scale ID	R	R	Parameter	0	CRC	CR	LF

Received data sequence is correct:

STX	Scale ID	R	R	Parameter	0	DDDDDD	CRC	CR	LF

Received data sequence is incorrect:

STX	Scale ID	R	R	N	O	CRC	CR	LF

Here:

Parameter —— 2bits; 33H 31H--33H 39H(represents reading **F3.1--F3.9**)

DDDDDD —— 6bits; parameter value of register

For example:

Command from upper computer：**02 30 31 52 52 33 31 30 31 31 0D 0A(**reading **F3.1)**

Correct response format：**02 30 31 52 52 33 31 30 30 30 30 35 30 30 30 34 0D 0A**

Incorrect response format：**02 30 31 52 52 4E 4F 32 30 0D 0A**

5.3.2.10 Writing Register 1-9

Sending Command format:

STX	Scale ID	W	R	Parameter	0	DDDDDD	CRC	CR	LF

Received data sequence is correct:

STX	Scale ID	W	R	O	K	CRC	CR	LF

Received data sequence is incorrect:

STX	Scale ID	W	R	N	O	CRC	CR	LF

Here:

Parameter —— 2bits; 33H 31H--33H 39H(represents reading **F3.1--F3.9**)

DDDDDD —— 6bits; parameter value of register

For example:

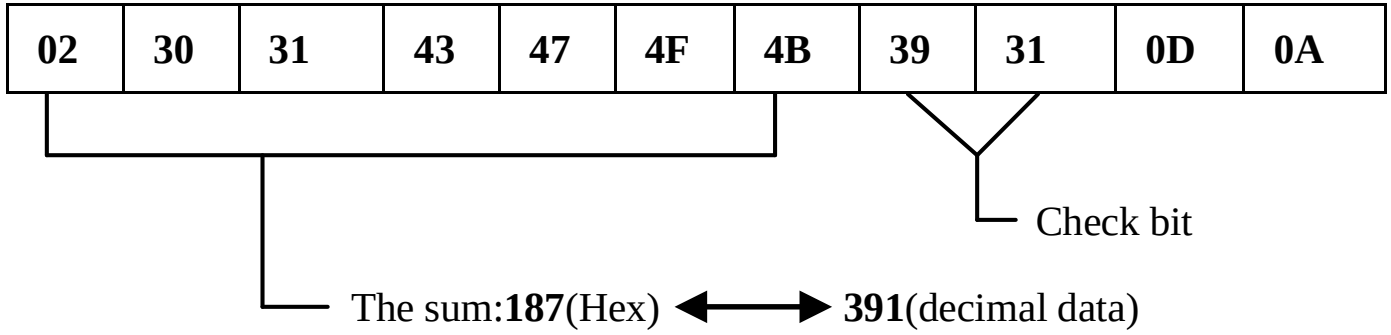
Command from upper computer：**02 30 31 57 52 33 31 30 30 30 30 35 30 30 30 39 0D 0A** (writing **F3.1 "500")**
Correct response format：**02 30 31 57 52 4F 4B 32 32 0D 0A**
Incorrect response format：**02 30 31 57 52 4E 4F 32 35 0D 0A**

5.3.3 CRC (Check sum) Count of RS Protocol

Count the sum of all the left bytes and convert the sum to a decimal data, and then convert the last **2** low-order digits of the decimal date to **ASCII** code..

For example:

See below data frame:



※Then work out: the check code of the above data frame is :**39 31**

5.4 SP1 Protocol

Communication mode can be set as continuous mode(**Cont**) and command mode（**Read**）.

Data Frames：	**8**data bits, **1** stop bit, Even parity (**8- E-1**)
	8data bits, **1** stop bit, Odd Parity (**8- O-1**)
	8data bits, **1** stop bit, No Parity (**8- n-1**)
	8data bits, **2** stop bits, No Parity (**8- n-2**)
	7data bits, **1** stop bit, Even parity (**7- E-1**)
	7data bits, **1** stop bit, Odd parity (**7- O-1**)
	7data bits, **2** stop bits, No parity (**7- n-2**)

Baud Rate：**1200**, **2400**, **4800**, **9600**, **19200**, **38400, 56700(Optional)**

Code：**ASCII**

Operation code: **W,** writing operation; **R,** reading operation; **C,** calibration; **O,** zeroing

5.4.1 Explanation form for parameter code

Operation code	Parameter code	Parameter name	Characters
R	**WT**	Reading current status and weight value	**8**
W	**DC**	Writing Max. capacity and Min. division	**8**
R/W	**PT**	Decimal point digits	**1**
R/W	**SE**	Sensitivity of sensor	**1**
R	**DD**	Min. division	**2**
R	**CP**	Max. capacity	**6**

R/W	**AC**	Automatic zeroing switch	**1**
R/W	**TR**	Range of Zero-Tracking	**1**
R/W	**MR**	Range of motion detecting	**1**
R/W	**ZR**	Range of zeroing	**2**
R/W	**FL**	Digital filter parameter	**1**
R/W	**VC**	Steady state filter	**1**
R/W	**R 1-R 9**	Register **1-9**	**6**
R	**AM**	Absolute Millivolt value	**7**bits: **D6D5D4D3D2D1D0; D6:+;D5-D0:ASCII** code of **6**bits

			corresponding Millivolt value Decimal point:**4**bits
R	**RM**	Millivolt value of relative zero	**7**bits: **D6D5D4D3D2D1D0;** **D6:+/ - ;D5-D0: ASCII** code of **6**bits corresponding Millivolt value; Decimal point:**4**bits
C	**ZY**	Zero calibration with weight	
C	**ZN**	Zero calibration without weight	**6**
C	**GY**	Gain calibration	**6**

		with weight	
C	**GN**	Gain calibration without weight	**12**
O	**CZ**	Zeroing	

5.4.2 Explanation form for wrong code

Under communication mode, if the transmitter received wrong data frame, there will be a wrong code as below:

1.CRC check error **2.** Operation code error

3.Parameter code error **4.**Writing data error

5.Operation can’t be performed **6.**channel number error

Remark: the default channel number is: **1（31H）**

5.4.3 Continuous Mode "Cont"

Under this mode, the indicator will automatically transmit collected data to upper computer without command. The data frames as follows:

STX	Scale ID	Channel NO	Status	Weight value	CRC	CR	LF

Here:

STX——1bit; Start**:02H**

Scale ID ——2bits; range is **00~99**

Status ——2bits; High Byte:**40H**; The definition of Low Byte is as below:

D6	D5	D4	D3	D2	D1	D0
no definition	no definition	no definition	plus/minus	zero	overflow	stable
fixed:**1**	fixed:**0**	fixed:**0**	**0**：plus **1**：minus	**0**：not zero **1**：zero	**0**：normal **1**：overflow	**0**：stable **1**：unstable

Weight value—— 6bits; return to "blank space blank space **OFL** blank space" when the weight value is plus(minus) overflow.

CRC —— 2bits, check sum
CR —— 1bit，0DH
LF —— 1bit，0AH

For example:

Automatically return to data: **02 30 31 31 40 40 30 30 32 31 36 35 37 38 0D 0A**

Then we know the current status of indicator is:

Stable; weight value is plus and **2.165.**

5.4.4 Command Mode(Read)

Under this mode, the indicator will transmit collected data to upper computer only when received command.

5.4..4.1 Reading the current status of transmitter

Sending Command format:

STX	Scale ID	Channel NO.	R	WT	CRC	CR	LF

Received data sequence is correct:

STX	Scale ID	Channel NO.	R	WT	Status	Display value	CRC	CR	LF

Received data sequence is incorrect:

STX	Scale ID	Channel NO.	R	WT	E	Wrong code	CRC	CR	LF

Here: STX——1bit; Start:02H

R ——1bit;52H

WT —— 2bits; 57H 54H
E —— 1bit; 45H

Status ——2bits; High Byte:**40H**; The definition of Low Byte is as below:

D6	D5	D4	D3	D2	D1	D0
no definition	no definition	no definition	plus/minus	zero	overflow	stable
fixed:**1**	fixed:**0**	fixed:**0**	**0**：plus **1**：minus	**0**：not zero **1**：zero	**0**：normal **1**：overflow	**0**：stable **1**：unstable

Display value—— 6bits; return to “blank space blank space **OFL** blank space” when the weight value is plus(minus) overflow.

Wrong code —— 2bits; refer to the explanation for wrong code

For example:

Command from upper computer：**02 30 31 31 52 57 54 30 31 0D 0A**
Correct response format：**02 30 31 31 52 57 54 40 40 30 30 30 31 33 32 32 33 0D 0A**（stable status, current main display is **0.132**）
Incorrect response format：**02 30 31 31 52 57 54 45 31 31 39 0D 0A**

5.4.4.2 Reading other Parameter

Sending Command format:

STX	Scale ID	Channel NO.	R	Parameter code	CRC	CR	LF

Received data sequence is correct:

STX	Scale ID	Channel NO.	R	Parameter code	Parameter value	CRC	CR	LF

Received data sequence is incorrect:

STX	Scale ID	Channel NO.	R	Parameter code	E	Wrong code	CRC	CR	LF

Parameter value——1 bit;

Parameter code——2 bits, refer to the explanations of parameters, input corresponding codes,

for example, if need to read range of motion detecting, then input corresponding parameter code **MR(4DH 52H).**

For example:

Command from upper computer：**02 30 31 31 52 4D 52 38 39 0D 0A**
Correct response format：**02 30 31 31 52 4D 52 35 34 32 0D 0A**（range of motion detecting: **5**）
Incorrect response format：**02 30 31 31 52 4D 52 45 31 30 37 0D 0A**

5.4.4.3 Writing Max. Capacity and Min. Division

Sending Command format:

STX	Scale ID	Channel NO.	W	DC	Division value	Max. capacity	CRC	CR	LF

Received data sequence is correct:

STX	Scale ID	Channel NO.	W	DC	O	K	CRC	CR	LF

Received data sequence is incorrect:

STX	Scale ID	Channel NO.	W	DC	E	Wrong code	CRC	CR	LF

Here:
DC —— 2bits, 44H 43H

O —— 1bit, 4FH
K —— 1bit, 4BH
Division value——2bits, 1/2/5/10/20/50
Max. capacity——6bits, write-in Max. capacity value

For example:

Command from upper computer：**02 30 31 31 57 44 43 30 35 30 31 30 30 30 30 36 30 0D 0A**
（division value is **5**； Max. capacity is **10000**）
Correct response format：**02 30 31 31 57 44 43 4F 4B 32 34 0D 0A**
Incorrect response format：**02 30 31 31 57 44 43 45 35 39 32 0D 0A**

5.4.4.4 Writing Max. Capacity and Min. Division

Sending Command format:

STX	Scale ID	Channel NO.	W	Parameter code	Parameter value	CRC	CR	LF

Received data sequence is correct:

STX	Scale ID	Channel NO.	W	Parameter code	O	K	CRC	CR	LF

Received data sequence is incorrect:

STX	Scale ID	Channel NO.	W	Parameter code	E	Wrong code	CRC	CR	LF

For example:

Command from upper computer：**02 30 31 31 57 5A 52 35 30 30 38 0D 0A**（write-in zeroing range **"50"**）

Correct response format：**02 30 31 31 57 5A 52 4F 4B 36 31 0D 0A**

Incorrect response format：**02 30 31 31 57 5A 52 45 31 32 35 0D 0A**

5.4.4.5 Zero Calibration

1) Zero Calibration with Standard Weight

Sending Command format:

STX	Scale ID	Channel NO.	C	ZY	CRC	CR	LF

Received data sequence is correct:

STX	Scale ID	Channel NO.	C	ZY	O	K	CRC	CR	LF

Received data sequence is incorrect:

STX	Scale ID	Channel NO.	C	ZY	E	Wrong code	CRC	CR	LF

Here:

Z —— 1bit, 5AH

Y —— 1bit, 59H

For example:

GM8802C-D110101

Command from upper computer：**02 30 31 31 43 5A 59 39 34 0D 0A**
Correct response format：**02 30 31 31 43 5A 59 4F 4B 34 38 0D 0A**
Incorrect response format：**02 30 31 31 43 5A 59 45 35 31 36 0D 0A**

2) Zero Calibration without Standard Weight

Sending Command format:

STX	Scale ID	Channel NO.	C	ZN	Zero millivolt	CRC	CR	LF

Received data sequence is correct:

STX	Scale ID	Channel NO.	C	ZN	O	K	CRC	CR	LF

Received data sequence is incorrect:

STX	Scale ID	Channel NO.	C	ZN	E	Wrong code	CRC	CR	LF

Here:

ZN —— **2bits, 5AH 4EH**

Zero millivolt —— **6bits,** decimal point fixed: **4**.

For example:

Command from upper computer：**02 30 31 31 43 5A 4E 30 31 32 36 31 30 38 31 0D 0A**
Correct response format：**02 30 31 31 43 5A 4E 4F 4B 33 37 0D 0A**
Incorrect response format：**02 30 31 31 4D 5A 4E 45 32 31 32 0D 0A**

5.4.4.6 Gain Calibration

1) Gain Calibration with Standard Weight

Add a standard weight approaching 80% of the Max. capacity ,then write in the current value of the standard weight to finish gain calibration.

Sending Command format:

STX	Scale ID	Channel NO.	C	GY	Weight value	CRC	CR	LF

Received data sequence is correct:

STX	Scale ID	Channel NO.	C	GY	O	K	CRC	CR	LF

Received data sequence is incorrect:

STX	Scale ID	Channel NO.	C	GY	E	Wrong code	CRC	CR	LF

Here:

GY —— 2bits, 47H 59H

Weight value —— 6bits: write-in the standard weight value

For example:

Command from upper computer: **02 30 31 31 <u>43</u> <u>47 59</u> <u>30 30 30 32 30 30</u> 36 35 0D 0A**（writing data: weight value is **200**）

Correct response format：**02 30 31 31 43 47 59 4F 4B 32 39 0D 0A**
Incorrect response format：**02 30 31 32 43 47 59 45 36 39 39 0D 0A**

2) Gain Calibration without Standard Weight

Input the standard weight value in Appendix and the corresponding gain Millivolt value to finish gain calibration.

Sending Command format:

STX	Scale ID	Channel NO.	C	GN	Gain millivolt	Weight value	CRC	CR	LF

Received data sequence is correct:

STX	Scale ID	Channel NO.	C	GN	O	K	CRC	CR	LF

Received data sequence is incorrect:

STX	Scale ID	Channel NO.	C	GN	E	Wrong code	CRC	CR	LF

Here：

Gain millivolt —— 6bits, corresponding gain millivolt value of standard weight（decimal point fixed:**4**）

Weight value—— 6bits, the standard weight value

For example:

Command from upper computer：**02 30 31 31 43 47 4E 30 30 31 39 34 30 30 30 30 32 30 30 35 36 0D 0A**（Writing data：weight value is **200**，corresponding gain millivolt is **0.194**）
Correct response format：**02 30 31 31 43 47 4E 4F 4B 31 38 0D 0A**
Incorrect response format：**02 30 31 31 43 5A 52 45 33 30 37 0D 0A**

5.4.4.7 Zeroing Operation

Sending Command format:

STX	Scale ID	Channel NO.	O	CZ	CRC	CR	LF

Received data sequence is correct:

STX	Scale ID	Channel NO.	O	CZ	O	K	CRC	CR	LF

Received data sequence is incorrect:

STX	Scale ID	Channel NO.	O	CZ	E	Wrong code	CRC	CR	LF

For example:

Command from upper computer：**02 30 31 31 4F 43 5A 38 34 0D 0A**
Correct response format：**02 30 31 31 4F 43 5A 4F 4B 33 38 0D 0A**
Incorrect response format：**02 30 31 31 4F 43 5A 45 35 30 36 0D 0A**

5.4.4.8 Reading Register 1-9

Sending Command format:

STX	Scale ID	R	Parameter code	CRC	CR	LF

Received data sequence is correct:

STX	Scale ID	R	Parameter code	DDDDDD	CRC	CR	LF

Received data sequence is incorrect:

STX	Scale ID	R	Parameter code	N	O	CRC	CR	LF

Here:

Parameter code —— **2bits, R1—R9**，refer to parameter address of registers to write-in parameter codes, for example, write-in register **F3.3, then the parameter code is R3（52H 33H）**

For example:

Command from upper computer：**02 30 31 52 52 31 31 32 0D 0A**(reading register **F3.1**)

Correct response format：**02 30 31 52 52 31 30 30 30 35 30 30 30 35 0D 0A**

Incorrect response format：**02 30 31 52 52 31 4E 4F 36 39 0D 0A**

5.4.4.9 Writing Register 1-9

Sending Command format:

STX	Scale ID	W	Parameter code	DDDDDD	CRC	CR	LF

Received data sequence is correct:

STX	Scale ID	W	Parameter code	O	K	CRC	CR	LF

Received data sequence is incorrect:

STX	Scale ID	W	Parameter code	N	O	CRC	CR	LF

Here:

Parameter code —— **2bits, R1—R9**，refer to parameter address of registers to write-in parameter codes, for example, write-in register **F3.3, then the parameter code is R3（52H 33H）**

For example:

Command from upper computer：**02 30 31 57 52 31 30 30 30 35 30 30 30 31 0D 0A** (writing register **F3.1:500**)

Correct response format：**02 30 31 57 52 31 4F 4B 37 31 0D 0A**

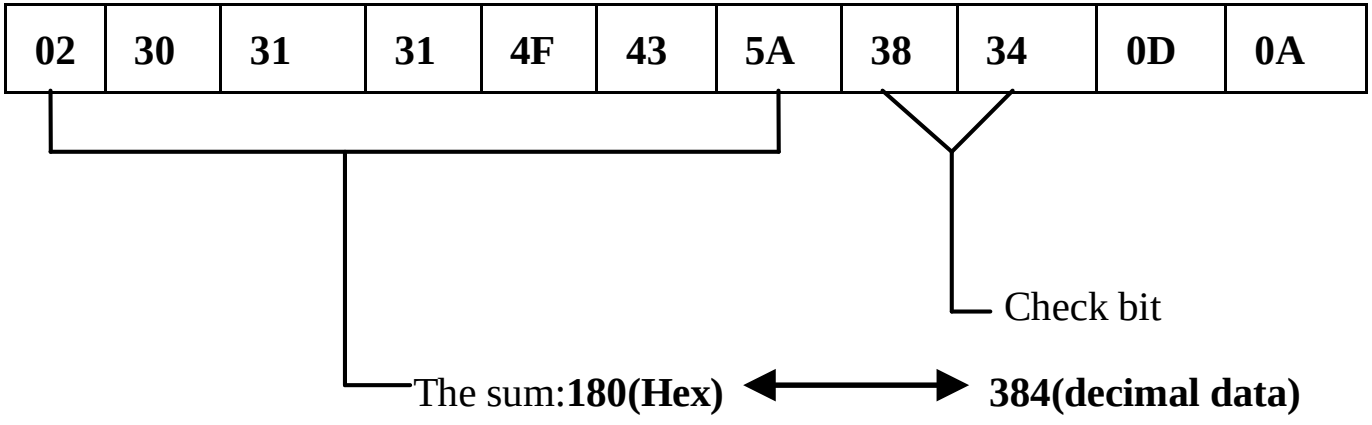
Incorrect response format：**02 30 31 57 52 31 4E 4F 37 34 0D 0A**

5.4.4.10 CRC Count

Count the sum of all the left bytes and convert the sum to be a decimal data, and then convert the last **2** low-order digits of the decimal date to **ASCII** code.

For example:

See below data frame:



※Then work out: the check code of the above data frame is **:38 34**

■5.5 Modbus Protocol

5.5.1 Modbus Communication Mode

RTU Mode

Under this mode, every **8-bit** byte of the message are divided into **2**pcs of **4-bit** hexadecimal characters to transmit at binary code.

The data frame as below:

Data Frames：	**8**data bits, **1** stop bit, Even parity **(8- E-1)**
	8data bits, **1** stop bit, Odd Parity **(8- O-1)**
	8data bits, **1** stop bit, No Parity **(8- n-1)**
	8data bits, **2** stop bit, No Parity **(8- n-2)**

Baud Rate：**1200/2400/4800/ 9600/ 19200/ 38400/ 56700(Optional)**

Code：binary system

ASCII Mode

Under this mode, every **8**-bit byte is transmitted as **2** pcs of **ASCII** characters.

The data frame:

Data Frames：	**8**data bits, **1** stop bit, Even parity **(8- E-1)**
	8data bits, **1** stop bit, Odd Parity **(8- O-1)**
	8data bits, **1** stop bit, No Parity **(8- n-1)**
	8data bits, **2** stop bit, No Parity **(8- n-2)**
	7 data bits, **1** stop bit, Even parity **(7- E-1)**
	7 data bits, **1** stop bit, Odd parity **(7 - O-1)**
	7 data bits, **2** stop bit, No Parity **(7- n-2)**

Baud Rate：**1200/2400/4800/ 9600/ 19200/ 38400/ 56700(Optional)**

Code：**ASCII** Code

5.5.2 Modbus Communication Address

PLC address	Display address	Explanation
Below Contents are Read-Only Register(function code is0x03)		
40001	**0000**	Current weight value(**4** bytes with sign digits, high-order ahead)
40002	**0001**	
40003	**0002**	**D15—D14……D4 — D3 — D2 — D1 — D0** **0** **0**:plus **0**:not zero **0**:normal **0**:stable **1**:minus **1**:zero **1**:overflow **1**:unstable
40004 **…...** **40007**	**0003** **……** **0006**	Reserve（allow reading out, read out**"0"**）

Below Contents are 2 bytes for Writing and Reading (Writing function code: **0x06**) Reading function code: **0x03**)		
40008	**0007**	Automatically zeroing when power on (**0: OFF;1:ON**)
40009	**0008**	Range of Zero-Tracking（**0-9**）
40010	**0009**	Range of motion detecting（**1-9**）
40011	**0010**	Range of zeroing（**0%-99%**）
40012	**0011**	Filter Level **(0-9)**
40013	**0012**	Steady status filter **(0-9)**
40014…… 40016	**0013…… 0015**	Reserve（read out**"0"**， only for later update）
40017	**0016**	Position of decimal point（**0- 4**）
40018	**0017**	Min. division value（ **0-5**; represents: **1/ 2/ 5/ 10/ 20/ 50**）
40019	**0018**	Sensor sensitivity（**0-1**； represents: **2mV/V**、**3mV/V**）

40020	**0019**	Zero calibration with weight: write-in data"**1**",zero calibration with current weight value. sensor sensitivity is **2 m V / V**: Range of Millivolt value is（**0.000- 9.000mV**）; sensor sensitivity is **3 m V / V**:Range of Millivolt value is **(0.000- 13.000mV)**;
40021	**0020**	Zero calibration without weight, input zero Millivolt value. Input range is: Sensor sensitivity is **2 m V / V**:Range of Millivolt value is（**0.001- 9.000mV**）; sensor sensitivity is **3 m V / V**:Range of Millivolt value is **(0.001- 13.000mV)**
40022… 40030	**0021…… 0029**	Reserve（read out**"0"**）

Below Contents are 4 bytes for Writing and Reading (Writing function code: **0x10**; Reading function code: **0x03**)		
40031-0032	**0030-0031**	Max. capacity; Input range is(Max. capacity ≤Min. division***30000**)
40033-0034	**0032-0033**	Gain calibration with weight; Input standard weight value(≤ Max. capacity)
40035-40036	**0034-0035**	Gain calibration without weight;Input gain Millivolt value(sensor sensitivity is **2mV/V:0.000**＜millivolt value≤**10.000**mV－zero millivolt value); (Sensor sensitivity is **3mV/V:0.000** ＜ millivolt value≤**15.000**mV－zero millivolt value)
40037-40038	**0036-0037**	Gain calibration without weight; Input gain weight value(≤ Max. capacity)

40039-40040 ……40055-40056	**00038-00039……00054-00055**	**F3.1** storage address **……** **F3.9** storage address
Below are Read-Only Contents (function code: **0 x 0 1**)		
00041	**0040**	**0**：Stable; **1**：Unstable
00042	**0041**	**0**：Normal； **1**：Overflow
00043	**0042**	**0**：Not zero； **1**：Zero;
00044	**0043**	**0**：‘ + ’;; **1**：‘ - ’
00045….. 00056	**0044….. 0055**	Reserve（read out**”0”**）
Write and Read Contents (Reading function code: **0x01;**Writing function code: **0x05**)		
00057	**0056**	Zeroing.(input **FF00:**zeroing) ; return to **0** when reading coil **0**

5.5.3 Explanation of Function Code

There are **5** function codes in above **Modbus** communication protocol:**01** Reading the status of the coil;**03** Reading holding register; **05** Force single coil;； **06** Preset single holding register; **16 (10 Hex)** preset multiple holding registers.

01 Reading the Status of the Coil

Query: Query information assigns the starting coil and the quantity of coil.

Response:

(1) Each status of the coil corresponds to each data: **1=ON;0=OFF.** The **LSB**（Least Significant Bit）of the first byte is the start address during query, the other coils are arranged from low bit to high bit till the **eighth** coil, the next byte is also arranged from low bit to high bit.

(2) If the return coil is not the multiple of **8**,then set **“0”**for the bits from the rest bits of the last bits to the highest bit ,the byte district represents all the byte number.

For example: Request to read **40 43** coil from Transmitter **01**

1) Under **RTU** Mode for communication:

Query command:

Transmitter Address	Function Code	Start Address	The Number of Coils	**CRC** Check
1 byte	**1 byte**	**2 bytes**	**2 bytes**	**2 bytes**

Received data sequence is correct:

Transmitter Address	Function Code	Counting Byte	Data District	**CRC** Check
1 byte	**1 byte**	**1 byte**	**1 byte**	**2 bytes**

Query command: **01 01 00 28 00 04 BD C1**

Received data sequence is correct: **01 01 01 02 D0 49**

The corresponding status of coil **43 40: 0 0 1 0**

2) Under **ASCII** Mode for communication:

Query command:

Start	Transmitter Address	Function Code	Start Address	TheNumber of Coils	**LRC** Check	End
1 character	**2** characters	**2** characters	**4** characters	**4** characters	**2** characters	**2** characters

Received data sequence is correct:

Start	Transmitter Address	Function Code	Counting Byte	Data District	**LRC** Check	End
1 character	**2** characters	**2** characters	**2** characters	**2** characters	**2** characters	**2** characters

Query command: **3A 30 31 30 31 30 30 32 38 30 30 30 34 44 32 0D 0A**

Received data sequence is correct: **3A 30 31 30 31 30 31 30 32 46 42 0D 0A**

The corresponding status of coil **43 40: 0 0 1 0**

03 Reading Register Status

Query: uery information assigns the start address and number of the registers.

Response: Response information assigns the byte number of the reading register, each register corresponds to **2** bytes; there is also the data value of each reading register in the response information.

For example: Reading register **0007、0008**

1) Under **RTU** Mode:

Query command:

Transmitter Address	Function Code	Start Address	Query the number of Registers	**CRC** Checl
1 byte	**1** byte	**2** bytes	**2** bytes	**2** bytes

Received data sequence is correct:

Transmitter Address	Function Code	Counting Byte	Register**0007** Data	Register**0008** Data	**CRC** Check
1byte	**1**byte	**1**byte	**2**bytes	**2**bytes	**2**bytes

Query command：**01 03 00 07 00 02 75 CA**

Received data sequence is correct：**01 03 04 00 00 00 05 3A 30**

The data for Register **0007**and Register **0008**:**0（Hex：0000H）、5（Hex：0005H）**

2) Under **ASCII** Mode:

Query command:

Start Address	Transmitter Address	Function Code	Start Address	Query the number of Registers	**LRC** Check	End

1 character	**2** characters	**2** characters	**4** characters	**4** characters	**2** characters	**2** characters

Received data sequence is correct:

Start	Transmitter address	Function code	Counting byte	Register **0007**	Register **0008**	LRC Check	End
1 character	**2** characters	**2** characters	**4** characters	**4** characters	**2** characters	**2** characters	**2** characters

Query command：**3A 30 31 30 33 30 30 30 37 30 30 30 32 46 33 0D 0A**

Received data sequence is correct：**3A 30 31 30 33 30 34 30 30 30 30 30 30 30 35 46 33 0D 0A**

The data for Register **0007**and Register **0008**: ：**0（Hex：0000H）、5（Hex：0005H）**

05 Force single coil

Query: Query information assigns the address of the coil that need to be forced； A constant in query data district the **ON/OFF** status for the requested coil: **FF00** value for **ON** status,**0000H** value for **OFF** status. Other value is ineffective to the coils.

Response: The coil being force status returns to normal response.

For example: Force the **0056** coil of Transmitter**01** is **ON** status

1) Under **RTU** Mode:

Force command:

Transmitter Address	Function Code	Coil Address	Forced Data	**CRC** Check
1 byte	**1** byte	**2** bytes	**2** bytes	**2** bytes

Received data sequence is correct:

Transmitter Address	Function Code	Coil Address	Forced Data	**CRC** Check
1 byte	**1** byte	**2** bytes	**2** bytes	**2** bytes

Force command: **01 05 00 38 FF 00 0D F7**

Received data sequence is correct：**01 05 00 38 FF 00 0D F7**

The coil **056** is set to be **“ON”** status.

2) Under **ASCII** Mode:

Force command:

Start	Transmitter address	Function code	Coil address	Forced data	**LRC** check	End
1 character	**2** characters	**2** characters	**4** characters	**4** characters	**2** characters	**2** characters

Received data sequence is correct:

Start	Transmitter address	Function code	Coil address	Forced data	**LRC** check	End
1 character	**2** characters	**2** characters	**4** characters	**4** characters	**2** characters	**2** characters

Force command: **3A 30 31 30 35 30 30 33 38 46 46 30 30 43 33 0D 0A**

Received data sequence is correct：**3A 30 31 30 35 30 30 33 38 46 46 30 30 43 33 0D 0A**

The coil **056** is set to be **“ON”** status.

06 Preset Single Register

Preset: Preset information assigns the address and value of the register need to be preset.

Response: The register returns to normal response after presetting.

For example: Please preset register **0009** of transmitter **NO.1** to **0005H.**

1) Under **RTU** Mode:

Preset command:

Transmitter Address	Function Code	Preset Register Address	Preset Value	CRC Check
1 byte	**1 byte**	**2 bytes**	**2 bytes**	**2 bytes**

Correct response:

Transmitter Address	Function Code	Preset Register Address	Preset Value	**CRC** Check

1 byte	1 byte	2 bytes	2 bytes	2 bytes

Preset command：**01 06 00 09 00 05 99 CB**

Correct response：**01 06 00 09 00 05 99 CB**

The value of register **0009** is **5**（**Hex：0005H**）

2) Under **ASCII** Mode:

Preset command:

Start	Transmitter address	Function code	Preset register address	Preset value	**LRC** check	End
1 character	**2** characters	**2** characters	**4** characters	**4** characters	**2** characters	**2** characters

Correct response:

Start	Transmitter address	Function code	Preset register address	Forced data	**LRC** check	End
1 character	**2** characters	**2** characters	**4** characters	**4** characters	**2** characters	**2** characters

Preset command：**3A 30 31 30 36 30 30 30 39 30 30 30 35 45 42 0D 0A**

Correct response：**3A 30 31 30 36 30 30 30 39 30 30 30 35 45 42 0D 0A**

The value of register **0009** is **5（Hex：0005H）**

16（10 hex） Preset Multiple Registers

Preset: Preset information assigns the start address and value of the register need to be preset.

Response: Normal response and return to the transmitter address、function code、start address and the number of preset registers.

For example: Put preset value into **2** registers of Transmitter **NO.1**,the start register is **0030**, preset values are **0001H** and **7318H.**

1) Under **RTU** Mode:

Transmitter address	Function code	Start address	The number of registers	Counting byte	Preset value	**CRC** check
1byte	**1byte**	**2bytes**	**2bytes**	**1byte**	**4bytes**	**2bytes**

Correct response:

Transmitter address	Function code	Start address	The number of registers	**CRC** check
1byte	**1byte**	**2bytes**	**2bytes**	**2bytes**

Preset command：**01 10 00 1E 00 02 04 00 01 73 18 07 D5**

Correct response：**01 10 00 1E 00 02 21 CE**

2) Under **ASCII** Mode:

Start	Transmitter address	Function code	Start address	The number of registers	Counting byte	Preset value	**LRC** check	END
1 character	**2** Characters	**2** Characters	**4** characters	**4** characters	**2** characters	**8** characters	**2** characters	**2** characters

Correct response:

Start	Transmitter address	Function code	Start address	The number of registers	**LRC** check	END
1 character	**2** characters	**2** characters	**4** characters	**4** characters	**2** characters	**2** characters

Preset command：**3A 30 31 31 30 30 30 31 45 30 30 30 32 30 34 30 30 30 31 31 43 39 36 31 38 0D 0A**

Correct response：**3A 30 31 31 30 30 30 31 45 30 30 30 32 43 46 0D 0A**

5.5.4 Error Message under Modbus Communication

The transmitter sends message back to the host when detected error except check code (CRC or LRC) . The highest bit of function code is **“1”**, It means that the function code which is sent by transmitter is **128** more than the function code which is sent by host（for example: reading register command,**03H** will be changed to **83H**）

Abnormal code:

02: illegal data address; the received data address is the unallowed address of transmitter.

03: illegal data; the value of query data field is the unallowed value of transmitter.

For example: The upper computer reads coil（**0040**）using function code **03**.

The data frame of error message:

1) Under **RTU** mode:

Transmitter address	Function code	Abnormal code	**CRC** check
1byte	**1byte**	**1byte**	**2bytes**

2) Under **ASCII** mode:

Start	Transmitter address	Function code	Abnormal code	**LRC** check	END
1byte	**2bytes**	**2bytes**	**2bytes**	**2bytes**	**2bytes**

For example: The upper computer reads coil（**0040**）using function code **03**.

1） Under **RTU** mode:

Query command: **01 03 00 28 00 01 04 02**

The response of receiving data incorrectly: **01 83 02 C0 F1**

2） Under **ASCII** mode:

Query command: **3A 30 31 30 33 30 30 32 38 30 30 30 31 44 33 0D 0A**

The response of receiving data incorrectly: **3A 30 31 38 33 30 32 37 41 0D 0A**

Refer to the data frames, the current wrong code is **02**. The current data address is illegal means

it's not allowed.

5.6 tt TOLEDO Protocol

Please refer to parameter **F2.2** and choose "**tt**" TOLEDO protocol，under this status, the transmitter will continuously sends data trough "**tt**" TOLEDO protocol.
The continuous mode **"Cont"** format of **tt** protocol as following:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
STX																CR	

⌣ **A B C** Display weight(**6bits**) **6 pcs 30H** check sum

Here: ASCII Start character:02(STX)

Status Word A is defined as following:

D0	0	1	0	1	0
D1	1	1	0	0	1
D2	0	0	1	1	1
Decimal point position	x	.x	.xx	.xxx	.xxxx

D3 D5 : **1**(invariant) **D4 D6**: **0(**invariant**)** **D7**: Even parity **(7 E-1)**

Status Word B is defined as following:

D7	D6	D5	D4	D3	D2	D1	D0
Even parity	Transmitter status		Unit	Stable	Overflow	Sign	G/N.W

Status Word C(Reserve)

5.7 RDP Philips Protocol

Please refer to parameter **F2.2** and choose "**RDP**" protocol，under this status, the transmitter will continuously sends data trough "**RDP**" protocol. Every sending delay is the value of **F2.6(ms)**.

Data frame:

STX	MODE	STATU	Weight	ETX
1	1	1+1	6	1

Here： **STX** —— Start: **02H**

MODE —— Communication mode, **31H** means gross weight.
STATU —— **2Byte** status byte.
Weight —— Display weight: **6 bits,** may include minus sign or blank space.
ETX —— **03H**

STATUS explanation:

STATUS 1 st:

Bit	Status	Explanation
6	**-**	Fixed **0**
5	**-**	Fixed **1**
4	**-**	Fixed **1**
3	**E**	**1: error or overflow**
2	**T**	**0**
1	**S**	**1:stable;0: unstable**
0	**Z**	**1: zero;0: not zero**

STATUS 2 nd:

Bit		Status
6	-	Fixed **0**
5	-	Fixed **1**
4	-	Fixed **1**
3	**M**	Fixed **1**
2	**K**	**0**
1	**DD**	**DD(00-11)** corresponding decimal point position: **0**、 **1**、 **2**、 **3**（sending 3 when the decimal point position ＞**3**）
0		

Note: The weight value is"------" when the weight is in error or overflows .

6 Operation

6.1 Zeroing Operation

Under normal status, press ■ to zeroing the data on main-display .

Errors alarm during zeroing:

"**Error 2**"：alarms when “current weight value”> “zeroing range” during zeroing operation;

"**Error 3**"：alarms when current weight display or system is not stable during zeroing operation.

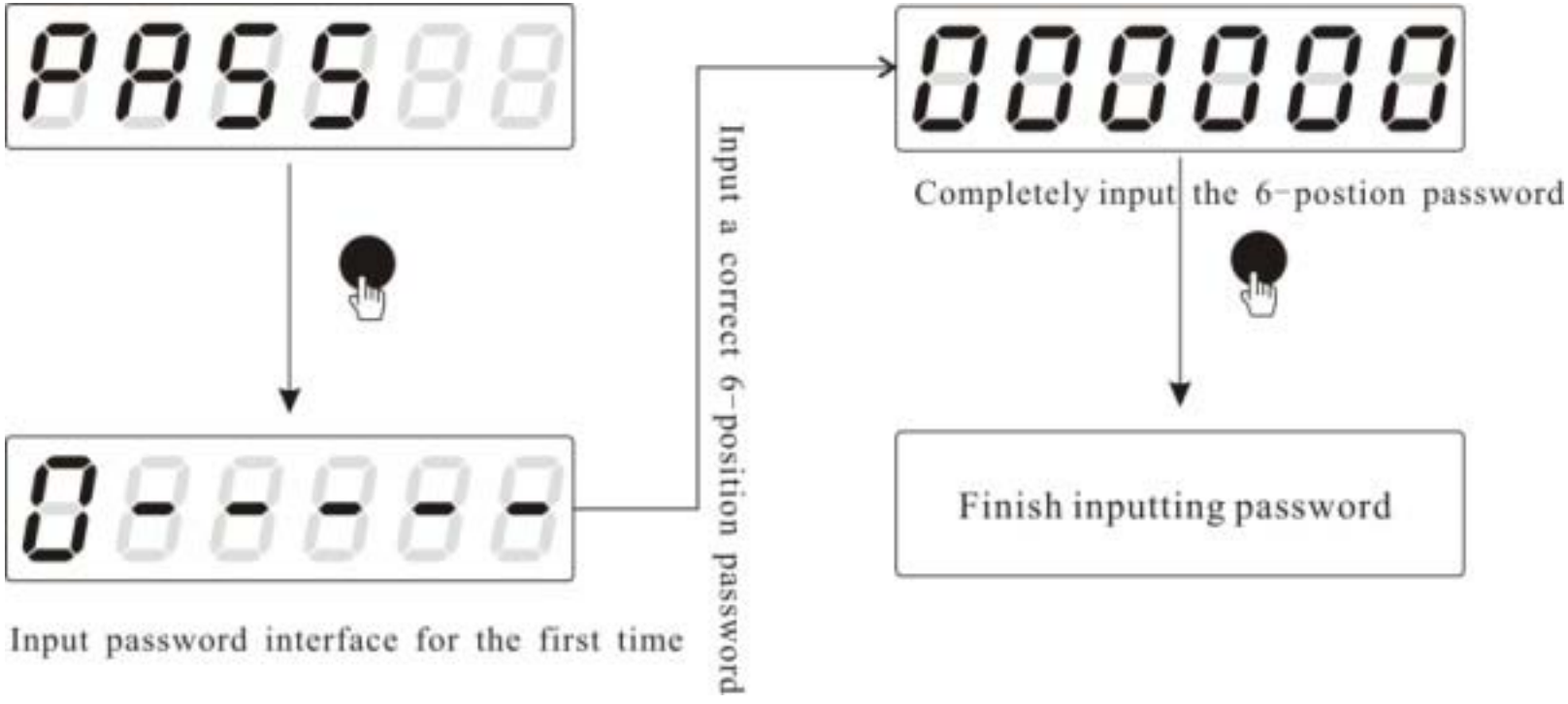
6.2 Inputting Password

（1） The initial password for calibration and parameter setting is **000000**.

（2） According to relevant standard, calibrated parameters are protected by password,

calibration password must be input before calibration.

（3）During parameter setting, if **F4.1**(password switch is set as“**ON”**，.password must be input when entering parameter setting interface.



Note:

（1）During inputting password, if the password your entered for the first time is incorrect, **GM8802C-D** weighing transmitter will return to the second inputting password interface, but the display will turn to from .

（2）If the password your entered for the second time is incorrect, **GM8802C-D** weighing transmitter will return to the third inputting password interface, but the display will turn to from .

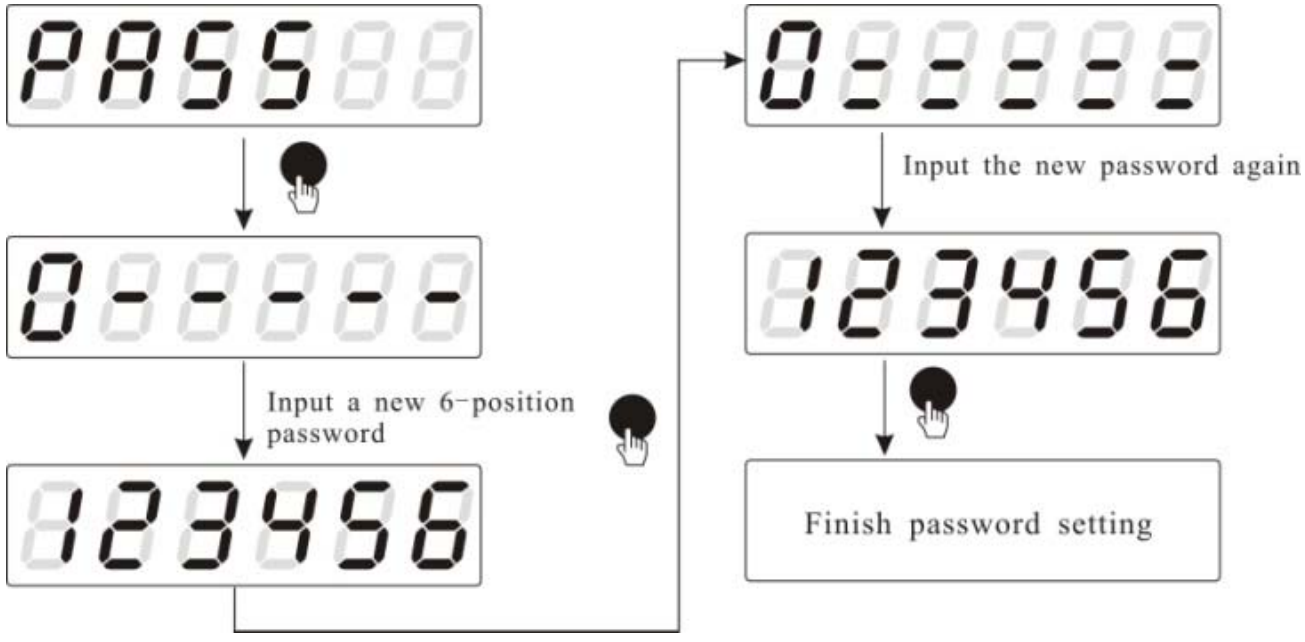
（3）If the password your entered for the third time is still incorrect, **GM8802C-D** will display "**Error 4**" and enter self-locking status, then you must power up again to operation.

6.3 Setting Password

（1）There are “setting parameter” items both during calibration and working parameters, if need to set password during working parameters, the **F4.1**(password switch) must be “**ON”.**

（2）During setting password, password can be set successfully only when the new password is

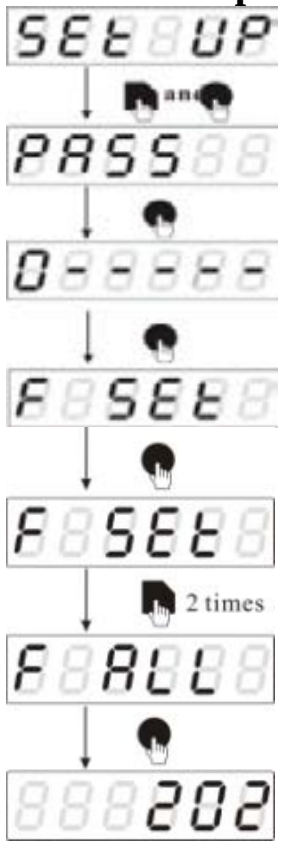
input twice and the two inputting passwords are same; If the two inputting passwords are not same, the GM8802C-D will display "**Error**" for one second, then return to password setting interface(**PASS**).



6.4 Recover Initial Settings

Note: Recover initial settings means that recover all parameters' settings to initial value, this operation may leads to abnormal working of **GM8802C-D** transmitter, so please don't operate except professional person!

For example(recover all parameter settings):



1.Under normal working status, press ■ one time to display **SET UP**, then meanwhile press ■ and ● to display '**PASS**' on the main-display.

2.When displaying "**PASS**", press ● to enter password setting status.

3. Input the special password " **880202**" for recovering initial settings. Press ▲and ■ to set values, then press ● to save password and enter recovering working parameters interface.

⇦ 4. On this interface, press ■ to switchover the content need to be recovered.

5. Calibrate the interface of parameter recovering:

; Press ● on the interface of parameter recovering, then return to normal working interface.

※After recovering operation, all parameter values will turn to initial values.

※Press ■ if you want to abandon recovering operation and return to weighing status.

Note: 1) Under "**F SET**" interface, press ● to recover working parameter settings.

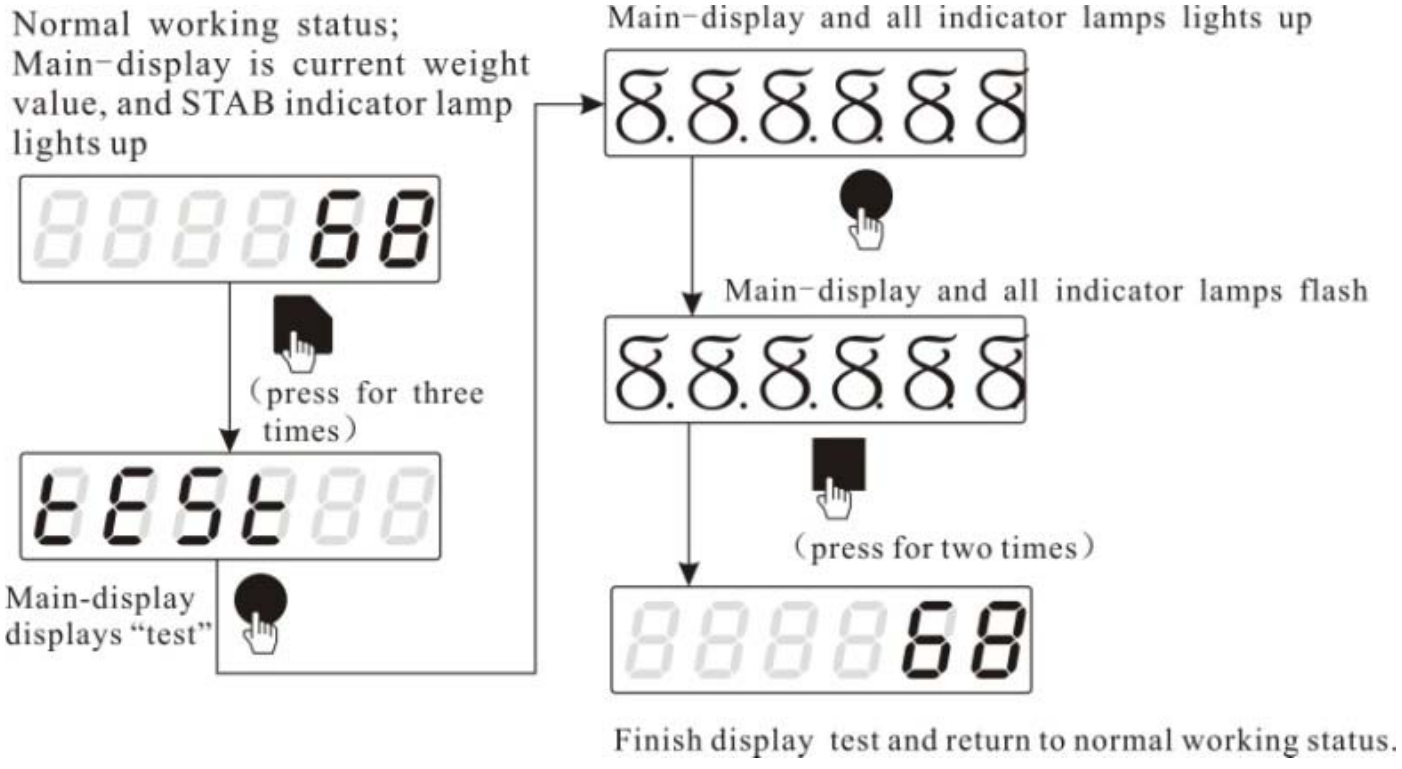
start recovering initial settings.

2) Under "**F CAL**" interface, press ● to recover parameter calibration.

3) Under "**F ALL**" interface, press ● to recover all parameter settings.

7 Display Test

Under normal status, display test is shown in flow chart below. If the test result is the same as flow chart, it means that display and indicator lamps all work well.


Normal working status;
Main-display is current weight value, and STAB indicator lamp lights up
(press for three times)
Main-display displays "test"
Main-display and all indicator lamps lights up
Main-display and all indicator lamps flash
(press for two times)
Finish display test and return to normal working status.

8 Errors and Alarm Messages

Error	①Input error. ②Incorrect data input, please check the corresponding parameter range.
Error 2	The current weight is not within the zeroing range when zeroing.
Error 3	The current weight value display (system) is not stable when zeroing.
Error 4	Password input is incorrect for **3** times.
OFL	Weighing result is positive overflow.
-OFL	Weighing result is negative overflow.
OVER	The output signal of load cell is too large while doing zero calibration.
UNDER	The output signal of load cell is too small while doing zero calibration.